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SUMMARY OF RECENT ABSTRACTS*

V. LEISHMANIASIS

Visceral Leishmaniasis

Epidemiology

de Azevedo (p. 24) reports that kala azar is apparently more common and widespread in Portugal than formerly, and that an increase in the incidence in dogs has accompanied the increase in man. Four species of *Phlebotomus* are found, the commonest (and the probable vector) being *P. perniciosus*. The author discusses the question of transmission, but in comment Shortt disputes some of his conclusions ; this discussion should be read in the original abstract.

Amalfitano *et al.* (p. 123) record several cases of kala azar in children in the Fondi plain, Italy. They think that the timely use of DDT has prevented its becoming epidemic. d'Alessandro *et al.* (p. 831) state that in 1944 and 1945 there was an outbreak of kala azar in Palermo, and they attribute this to *P. papatasi*, though this sandfly is not a proved vector of kala azar elsewhere. Control of *P. papatasi* (and of *Aëdes aegypti*) was effected with DDT.

Walters (p. 530) reports a case of kala azar in a patient who had always lived in a coastal town of the Gambia.

Although Bombay has hitherto been considered free from kala azar, except for a few sporadic cases, Bhende *et al.* (p. 337) now report 16 cases in a leprosy establishment there, in which there were 400 resident patients. Several of those infected had not lived in the known endemic areas of India. Six species of *Phlebotomus*, including *P. argentipes*, have been found in Bombay. In 1942 a sharp rise occurred in the incidence of kala azar in the eastern districts of the United Provinces (India) where previously the incidence had been only moderate. Prasad (p. 219) states that since then there has been an upward tendency, and that in a recent survey incidence rates up to 318 per 100,000 were revealed. Sandfly control would be very difficult, and the situation has been dealt with by an organized treatment campaign on a large scale.

Aetiology

Kirk (p. 725) thinks that on various biological grounds the leishmaniae pathogenic for man and dog can be classified into the three species *L. donovani*, *L. tropica* and *L. brasiliensis*. He gives a table on which this classification is

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1950, v. 47. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

based. MOHIUDDIN (p. 828) has carried out a detailed study of 12 strains of *Leishmania* of the different species recognized as pathogenic for man. The study included cultivation, and a consideration of morphology and behaviour of the flagellate forms. The author thinks that these organisms can be reduced to three subspecies, which HOARE, in comment, states would be named *L. donovani donovani, L. d. tropica* and *L. d. brasiliensis.*

FULTON and JOYNER (p. 529) have elaborated a technique for isolating leishmaniae from spleen tissue of hamsters, practically free from the accompanying tissue, and have been able to study the metabolism of *Leishmania donovani* of this tissue phase, and also of the flagellate forms from cultures. They have measured oxygen uptake, respiratory quotient, etc., and the degree of respiratory inhibition produced by cyanide and other substances, and by drugs known to be active against the disease. Details should be sought in the original, but it may be noted that inhibition of respiration has definite limitations in indicating leishmanicidal activity of drugs. FULTON *et al.* (p. 1188) have already shown that the cotton rat is highly susceptible to infection with *L. donovani*, although, unlike the golden hamster, it does not die of the infection. They now show that the infected cotton rat is a suitable animal for the trial of leishmanicidal drugs.

For the cultivation of leishmaniae from material, including blood, of patients suspected of kala azar, PATKAR (p. 726) strongly advocates the medium devised by Row.

Pathology : Tests : Clinical Findings

CHEMNITZ and KIRSCH (p. 337) report a fatal case of kala azar in which response to treatment was poor. The serum flocculation tests were consistently negative, and the globulin level of the plasma was low. This indicates failure of the reticulo-endothelial system to build up immune bodies against the infection, which was probably responsible for the fatal issue. The patient had had repeated attacks of *P. falciparum* malaria shortly before the onset of kala azar, and it is known that kala azar is often particularly severe in patients with malaria.

CORKILL (p. 610) agrees with NAPIER and KRISHNAN that kala azar is probably the clinical expression of an infection which is much more widespread than the disease itself, and that it is determined by some secondary factor. This factor is probably an increase of breakdown of protein as a result of other diseases, or a deficiency of protein from malnutrition. In that case there is inadequate protein for the production of specific antibodies.

BENHAMOU *et al.* (p. 830) have found that kala azar is characterized by increase in gamma globulin in the serum and by the presence of a protein fraction (x). These can be estimated by the method of electrophoresis, and this procedure provides a valuable indication of diagnosis, and, if repeated, of the progress of the disease.

By means of several tests of liver function, CHAKRAVARTY *et al.* (p. 726) have shown that there is considerable liver derangement in all stages of kala azar, and that it is most severe in the later stages. WU *et al.* (p. 339) report a case of kala azar in which cirrhosis of the liver was found at autopsy. The fibrosis was of recent origin and the authors consider that it was in part due to the leishmanial infection.

The Maclagan thymol test has been found positive in a few cases of human and canine leishmaniasis by RANQUE *et al.* (p. 341). They regard it as one of the most useful presumptive tests for kala azar. LE BOURDELLÈS (p. 611) believes that a test of serum flocculation in water, the result of which can be measured exactly in a Vernes photometer, may give information important in differentiating kala azar from malaria, and quotes a case in support of this contention.

From cultures of *L. donovani* GHOSH *et al.* (p. 829) have prepared an antigen for a complement-fixation test for kala azar. The test was positive in 192 cases of kala azar, doubtful in 3 and negative in 2 untreated and 10 treated cases of kala azar. It was also negative in 827 persons free from kala azar. The test becomes positive early in the disease, before the aldehyde test.

TRIPODI (p. 124) has found kala azar and malaria together in three patients. He discusses the conflicting views expressed by other workers as to whether this combination can occur. FISCHER and KRAUSE (p. 339) report a case of kala azar and malaria in a soldier, who was apparently exposed to infection in Greece. The kala azar did not show itself for 15 months after exposure, and the malaria for 17 months.

ECKER *et al.* (p. 124) report a patient in whom kala azar relapsed two years after apparent cure.

Treatment: Control

An account of the treatment of kala azar and its complications has been written by SEN GUPTA (p. 340). This should be read in full.

An account of the composition and structure of sodium antimony gluconate (Solustibosan), and its use in leishmaniasis, is given by SCHMIDT (p. 830). It is cheaper, more stable and less toxic than the preparations which preceded it, and it can be given in short, intensive courses. Intravenous Pentostam (sodium antimony gluconate) has been used with success in the field treatment of kala azar in China, in children and adults. The reactions and complications encountered were few. SUN (p. 220) states that 1 ml. contains 100 mgm. of pentavalent antimony, and the patients received 4 to 6 injections, each of 2 to 6 ml., according to age. TUCKMAN (p. 456) has used sodium antimony gluconate (Pentostam) in the treatment of 148 patients with kala azar in China. In most of the patients the drug was given in courses of 5–6 doses, which were injected either daily or twice each day. The courses lasted, therefore, for 3–6 days, and the total quantities varied from 9 ml. for children to 36 ml. for adults. The results were good and the side effects negligible.

CHEN (p. 340) describes a rapid treatment of Chinese kala azar with urea stibamine ; 11 of 12 patients were cured, the other died, probably from another cause. Details of administration are given in the abstract.

NAPIER (p. 341) discusses the subject of splenectomy in kala azar. It is justifiable to consider splenectomy when the drug of choice for the type of kala azar has failed to control symptoms, and when change to other drugs has proved ineffective, but at least one course of drug treatment should be given after removal of the spleen. Splenectomy is not a substitute for chemotherapy.

GERMUTH *et al.* (p. 1188) have developed a method of estimating the rate of disappearance of leishmaniae from the spleens of golden hamsters infected with *L. donovani*, after a single injection of a pentavalent antimony compound. The method involves cultivation of serial ten-fold dilutions of a suspension of spleen tissue. They found that viable parasites decreased in numbers for 16–32 days, and, they think that in human kala azar doses of antimony given once or twice a week should prove at least as effective as daily doses. The same authors (p. 1189) show that antimony has a prolonged action, and that tests of cure, in which material aspirated from the spleens of infected hamsters is cultivated, should not be performed until 6 weeks after the end of treatment. There is evidence that spleen tissue in the culture tends to inhibit growth of leishmaniae.

NAPIER (p. 125) refers to the paper by HO *et al.* [this *Bulletin*, 1949, v. 46, 815] on the rate of disappearance of *Leishmania* in kala azar under treatment with urea stibamine, and disputes several of the conclusions reached. The details should be sought in the original.

HERTIG (p. 343) discusses the effect on sandflies of the extensive DDT campaigns which have been carried out for the control of mosquitoes in Greece and Italy; there has been a great reduction of numbers of sandflies in the sprayed places. In Crete the incidence of kala azar was very considerably reduced before DDT was available, as a result of the control of dogs which was instituted before the war, but since DDT spray was used there has been a sharp fall in the incidence of oriental sore. The author concludes that treatment of interiors with DDT gives excellent protection from sandflies indoors, and house-spraying in compact communities eventually reduces *Phlebotomus* in those areas to near the vanishing point.

CUTANEOUS AND AMERICAN LEISHMANIASIS

LEFRANC (p. 342) failed to obtain cure of oriental sore with penicillin.

PIFANO (p. 727) gives an account of cutaneous leishmaniasis in Venezuela, and points out that the lesions may resemble those of yaws, fungus diseases, leprosy and other diseases. The vector is said to be *Phlebotomus panamensis*. Treatment is unsatisfactory. BARRIENTOS (p. 25) describes a patient with espundia, in whom the disease was for some time regarded as leprosy.

Dogs with cutaneous leishmaniasis have been found in Tucumán by ROMAÑA *et al.* (p. 125).

MAYER *et al.* (p. 611) have studied infection of mice with a strain of *L. brasiliensis*. *Charles Wilcocks*

MALARIA

BÉRÉNI, J. Trente ans de lutte antipaludique à In Salah (Tidikelt). [**Thirty Years of Antimalaria Activity in In-Salah (Tidikelt).**] *Arch. Inst. Pasteur d'Algérie.* 1950, Dec., v. 28, No. 4, 464–8.

In-Salah is an oasis in Tidikelt in the Algerian Sahara, which has been in French occupation since the beginning of this century. Thirty years ago A. BONNET published a report on the epidemiology and prevention of malaria in Tidikelt. The present report compares existing malaria conditions with those described by Bonnet.

The climate of In-Salah is of the continental desert type; north-east winds prevail during the greater part of the year. There is no rainy season but violent brief storms occur from time to time. The population of the oasis, Arabs, Berbers and Negroes, very mixed, numbers some 5,000, as compared with 3,000 in 1920. The vector responsible for malaria transmission is *Anopheles multicolor*. As late as 1935 the *sebkha* was a stagnant lake, from November to April, in the immediate vicinity of the palm groves. This offered abundant facilities for mosquito breeding. Since then drains have been dug and the *sebkha* has been removed 6 kilometres from the residential area. Gambusiae in the irrigation tank and channels control mosquito breeding therein. In 1950 the spleen rate of 284 children under 15 years of age was only 7 per cent.: none of the enlarged spleens passed the costal margin. The report contains little if any evidence of locally acquired malaria in In-Salah at the present time *Norman White*

HUGONOT, R. Une épidémie de paludisme au Sahara. [**A Malaria Epidemic in the Sahara.**] *Arch. Inst. Pasteur d'Algérie.* 1950, Dec., v. 28, No. 4, 469–508, 10 text figs. & 8 figs. on 4 pls. [14 refs.]

Beni Ounif lies on the southern slope of the Atlas, near the Morocco border, at an altitude of 823 metres. By railway it is 578 kilometres from the

Mediterranean, 340 kilometres as the crow flies. Eight kilometres to the north, behind a chain of hills, lies the large Moroccan Oasis, Figuig. Figuig with its vast palm groves, tanks, canals, abundant water and a population of 15,000, suffers from fairly intense endemic malaria.

Beni Ounif consists of a European village and an African village, or *ksar*, with its palm groves and gardens. The European village, grouped around the railway station and administrative buildings, is traversed by the railroad and the highway track. Less than 100 metres to the south is the left bank of the *oued* Melias. The *ksar*, some 600 metres to the east of the European village, consists of houses built of sun-dried bricks, sometimes of two storeys, around central courtyards. Palm trees and gardens cover an area of a square kilometre to the south of the *ksar*. The total population of Beni Ounif in 1948 was 1,606, of whom 134 were European, 95 Jews, and the remainder Mussulmans.

Beni Ounif has for the past 44 years received as much attention from the malariologist as any other infected place in Algeria. H. FOLEY published a report in 1908 : he has continued ever since to interest himself in that oasis. In 1905 there were 411 cases of malaria in a garrison of 1,500 which then occupied Beni Ounif. In 1906 the disease persisted with like intensity. Epidemiological inquiry showed that anophelines were breeding exclusively in the bed of the Melias *oued*, in stagnant pools left after the subsidence of the spring floods. The anophelines were then identified as *Pyretophorus chaudoyei* (Theobald), now known as *Anopheles multicolor*. The larvae of this species were able to develop in water the salinity of which, as the result of solar evaporation, exceeded the salinity of sea water. Energetic antilarval measures were put in hand.

Space does not permit any detailed summary of the events of subsequent years. Years of persistent endeavour, interrupted by events of the first world war, were eventually crowned with success. Levelling the bed of the *oued* Melias, channelling, and the use of larvicides contributed to that success. From 1926 to 1943 Beni Ounif was free from anophelines ; no case of malaria was reported during those 17 years. In 1943, 13 cases of *P. vivax* malaria occurred ; an epidemic of malaria was prevailing in Figuig at the time. In 1945 there were 201 cases of malaria in Beni Ounif. *A. multicolor* had re-established itself ; breeding places were numerous. In 1949 the spring rains were unusually heavy ; an epidemic of malaria followed. More than a third of the population were affected ; the diagnosis was confirmed by blood examination in 236 cases.

The author describes in detail the events of the 1949 epidemic. *P. falciparum* infections predominated : *P. malariae* was never seen. Mixed *P. falciparum* and *vivax* infections were common. *P. falciparum* infections in the dark races were relatively mild. *A. multicolor* was the only vector present.

Norman White

SCHWETZ, J. **On Mosquitoes and Malaria in the Aloro 'Gombolola' Lango District (Uganda).** *J. Trop. Med. & Hyg.* 1951, Feb., v. 54, No. 2, 36–8, 2 figs.

The Aloro Gombolola is situated in low-lying marshy ground near a tributary of the Nile. The swamps, covered with vegetation, are ideal breeding places for *Anopheles funestus*. The water holes dug by the people in the dry season are good breeding places for *Anopheles gambiae* : but these gradually become covered with vegetation also, and then become suitable for *A. funestus*.

During the course of a study of schistosomiasis in this area, in November 1949, the author was informed of heavy morbidity and mortality in infants

and small children, which was suspected as being caused by malaria. He collected a number of mosquitoes, which included 215 *Anopheles funestus* (169 females), 10 *A. gambiae* (6 females) and 3 female *A. coustani*.

Blood films were taken from 104 Africans, mostly infants and children. The results are shown in a table, and indicated " a typical picture of the African endemic malaria ". The findings generally showed severe and triple infections in small children, less severe and double infections (*P. falciparum* and *P. malariae*) in adolescents and only rare parasites of *P. falciparum* in adults.

In heavily infected infants and children, " a certain degree of anaemia " was found : but there were no febrile cases and all seemed to be in good health.

H. J. O'D. Burke-Gaffney

QUINBY, G. E. **Epidemiological Appraisal of Reported Malaria in the United States from 1947 through 1949.** *J. National Malaria Soc.* 1950, Dec., v. 9, No. 4, 397–400.

During 1948 and 1949 a special inquiry was undertaken to assess the accuracy of malaria morbidity reporting in the United States. Reported cases in the States of Alabama, Georgia, Mississippi and South Carolina numbered 4,815. Of these 1,042 were " appraised ". Of the 1,042 cases there were only 180 in which the diagnosis had been confirmed by blood films examined under laboratory standards acceptable to State health departments. Of the 180 infections thus disclosed 143 were *P. vivax*, 5 *P. malariae*, 3 *P. falciparum* and 29 undetermined. One hundred and fifteen of the 180 confirmed infections were believed to have been contracted outside the United States and only 59 certainly within the States. Wherever reported malaria is investigated in the United States it tends to disappear. *Norman White*

GAUD, J. & LAURENT, J. Les soies doublées chez les larves d'*Anopheles*. [**Duplication of Hairs in Anopheles Larvae.**] *Ann. Parasit. Humaine et Comparée.* 1950, v. 25, Nos. 5/6, 480–84, 2 figs. & 1 pl.

The authors have examined 26,000 *Anopheles* larvae collected in Morocco and have found that duplication of certain hairs occurred in 28 specimens, all in the third or fourth instars. No duplication of hairs occurred in 5,000 larvae of the first and second instars. *H. S. Leeson*

THOMSON, R. C. Muirhead. **Studies on Salt-Water and Fresh-Water** *Anopheles gambiae* **on the East African Coast.** *Bull. Entom. Res.* 1951, Feb., v. 41, Pt. 3, 487–502, 2 text figs. & 2 figs. on pl. [14 refs.]

While the West African brackish water form of *Anopheles gambiae* has now been shown to be a distinct species, *Anopheles melas*, with distinct morphological characters of egg, larva and adult, as well as a difference in habitat, work on the East African salt-water breeding *A. gambiae* has not led to so definite a result.

The author's studies began in July 1947 at Dar-es-Salaam and a focus of salt-water breeding was found at Changombe, a village 4 miles north. The most dense and continuous breeding occurred in peaty ponds up to half a mile inland from the tidal zone. These ponds were found to have a salinity of up to 50 per cent. sea-water. The specimens of *A. gambiae* taken could not be distinguished morphologically from fresh-water *gambiae* at any stage, though a proportion of females had an additional dark band on the palps, as in *A. melas*. Investigations were based on a difference in survival of newly-hatched larvae in 75 per cent. sea-water, a test which was applied to the progeny of all females captured, except those bearing the extra dark band on the palps.

The larvae of fresh-water *gambiae* were killed within 2 hours by 75 per cent. sea-water, while the salt-water forms survived at least 6 hours. Only at Changombe, out of 4 stations around Dar-es-Salaam, were significant numbers of the salt-water form found, and this scarcity is believed to be due to extensive drainage of the Msimbazi creek, which was formerly a notorious salt-water breeding site. No breeding occurred in a large mangrove orchard which would have been suitable for the W. African *A. melas*.

By means of the techniques developed in W. Africa, extensive studies were made of the populations, house-haunting habits, and infectivity of the salt- and fresh-water *gambiae* in Changombe. Catches in African houses showed between 28 per cent. and 93 per cent. salt-water *gambiae* during the periods Sept.–Nov. 1947 and April–Aug. 1948, but experiments with huts fitted with window traps showed that 35–40 per cent. of salt-water *gambiae* left the hut after feeding, compared with an insignificant proportion of fresh-water *gambiae* and *funestus*, doing so. The salt-water form was found to be very much less infected with malaria (0·8 per cent. of 741 dissections) than the fresh-water form (9·4 per cent. of 447 dissections). Filarial infection was about equal (4·1 per cent. and 3·8 per cent.) but the salt-water form reached a maximum infection of 22 per cent. in October 1947. Of those females remaining in the huts after feeding, up to one-third leave, in a half-gravid condition, the following night. Their malarial infection is about the same as those which remain. Observations with artificial outdoor resting places confirm that the fresh-water *gambiae* resting outdoors are mostly gravid, while the salt-water variety are mostly blood-fed.

Although the salt-water forms can survive high salinity in the laboratory, a natural population was seen to disappear as salinity rose from 60 per cent. to 83 per cent. sea-water. It is suggested that this intolerance of high salinity coupled with the high salinity of the Indian Ocean on this coast, is responsible for the limited occurrence of the salt-water variety of *A. gambiae*. The possibility is discussed of controlling anophelines on two large fresh-water swamps near Dar-es-Salaam, by connecting the swamps to the sea *via* a sluice-gate system.

The paper concludes that this salt-water variety of *Anopheles gambiae* is quite distinct from *Anopheles melas*, and has evolved separately.

A. J. P. Goodchild

Kuitert, L. C. & Hitchcock, J. D. **Observations on** *Anopheles leucosphyrus* **Don. at Shingbwiyang, Burma (Diptera, Culicidae).** *Proc. Entom. Soc. of Washington*. 1948, v. 50, No. 4, 77–82, 1 graph. [Summary taken from *Rev. Applied Entom.* Ser. B. 1950, Dec., v. 38, Pt. 12, 201.]

The results are given of observations on the breeding places, prevalence and relation to malaria of *Anopheles leucosphyrus*, Dön. at Shingbwiyang, in northern Burma, in 1944. The area includes a river, open and thickly wooded swamps and steep hills with dense jungle vegetation and numerous winding streams. The soil is soft and deep, so that large ruts are easily made and abundant pools are formed in the rainy season (April to September), and clearing of camp sites had made very varied shade conditions around these pools. Meteorological data for part of 1944 are given ; rainfall was particularly heavy in June, July and September. Collections of Anopheline larvae were begun in February, and larvae of *A. leucosphyrus* were first found in March, in pot-holes in large rocks along the river and in pools made by floatage in mountain streams. They were later found in rain puddles with either muddy or grassy bottoms, shady or sunlit slit trenches, a large reservoir formed by damming a stream, clear water or water polluted with decaying leaves in

pot-holes, shallow seepage pools, small shady swamps and artificial containers. Their numbers increased markedly in early May, and they were found in more than half the collections made throughout June and early July, when they constituted more than 60 per cent. of the Anopheline larvae identified. They became comparatively scarce in August and September, but their numbers increased again in October–December. The percentage of *A. leucosphyrus* among adult Anophelines reared from pupae collected in the field rose from 6 in April to 88 in June, fell to 13 in August and rose again to 72 in November. The species was predominant in adult catches throughout June, July and August, comprising 80 per cent, or more of the catch in the later two months. Most of the adults were found out of doors, but a few were taken inside tents and warehouses, Of 112 females dissected for malaria parasites, three contained sporozoites. In two of these, in addition to typical sporozoites of human malaria, there was a larger number of atypical forms, the appearance of which is briefly described. It is possible that the atypical appearance may have been the result of distortion due to technical methods. Of 112 females dissected from the neighbourhood of Ledo, Assam, four, taken at a native labour camp, had gland infections. The malaria rate per 1,000 at Shingbwiyang for the year is shown on a graph. A sharp rise in the rate in July was significantly correlated with the percentage of *A. leucosphyrus* among the total larvae identified and with rainfall. The rise in numbers of larvae during October and November was not reflected in the malaria incidence. Adult collections were negligible during this period, possibly partly because a programme of spraying with 5 per cent. DDT in oil was in force by that time. It is concluded that *A. leucosphyrus* is an efficient vector of malaria in the area.

VAN HELL, J. C. De betekenis van *A.* (*A*) *hyrcanus* var. X als malaria-overbrenger op Zuid-Celebes. [**The Significance of** *A.* (*A*) *hyrcanus* **var.** *X* **as a Vector of Malaria in South Celebes.**] *Med. Maandblad.* Djakarta. 1950, Dec. 1, v. 3, No. 12, 557–67, 1 map. [11 refs.] English summary.

Anopheles hyrcanus var. *X* was first recorded in Indonesia in 1939. Researches before and since the war have shown that this variety is particularly characteristic of South Celebes. In one instance cited, of some 18,000 mosquitoes caught in 1946, 2,477 were of this variety and came exclusively from South Celebes. The variety, however, does occur in a few places in North Celebes and on the islands south of Celebes such as Salaiar, Buton and Muna, as well as in other parts of Indonesia.

In South Celebes *A. hyrcanus* var. *X* is a little more plentiful on the coastal plains than on the highlands inland, probably because the number of suitable breeding places is larger on the former. Breeding places appear to be in *sawahs* (rice fields) which are not adequately drained after harvest, in fresh-water ponds with vegetation and in slowly moving water in newly developed territory. In rice fields it is suggested that really adequate draining after the rice harvest is often successful. In ponds, marginal and floating vegetation should be removed. The water surface should be clean and the depth of the pond at least 40 cm. When country is being developed the possible breeding places should be removed.

It seems that unless *A. hyrcanus* var. *X* appears in very large numbers it is unlikely to start a malaria epidemic. The natural infection rate of this variety may be as much as 10 per cent., as is the rate in the other varieties *sinensis* and *nigerrimus*. This however is sufficient to maintain a light endemic malaria.

The author believes that if rice fields and public works are carried out with some knowledge of anopheline breeding places much of the danger of *A. hyrcanus* var. *X* can be avoided. [See also this *Bulletin*, 1951, v. 48, 322.]

J. H. Sudd

ROBERTS, F. H. S. **The Distribution and Seasonal Prevalence of Anopheline Mosquitoes in North Queensland.** *Proc. Roy. Soc. Queensland.* 1948, v. 59, Pt. 2, 93–100. [Summary taken from *Rev. Applied Entom.* Ser. B. 1950, Dec., v. 38, Pt. 12, 202–3.]

In connection with the concentration of troops in northern Queensland, particularly around Townsville and Cairns, thorough surveys were made to determine the Anophelines present and obtain information about them. Before 1942, *Anopheles annulipes*, Wlk., *A. bancrofti bancrofti*, Giles, and *A. amictus*, Edw., represented by the typical form and subsp. *hilli*, Woodhill & Lee had been recorded from northern Queensland, and six other species of *Anopheles* and *Bironella gracilis*, Theo., were recorded later. *A. farauti*, Lav., is thought to be the only considerable vector of malaria in Queensland. Notes are given on the physical characters and climate of the area studied (the coastal area from Townsville to Cairns, the Cairns hinterland and the country west of Townsville) and on the geographical and seasonal distribution and prevalence of the various species there. *A. farauti* was common on the coastal plain ; its distribution appeared to be related to the presence of rain-forest, which seemed to provide the moist sheltered resting places required by the adults, and by altitude. The highest altitude at which it was found was 1,300 ft., although there are large areas of rain-forest on the Atherton Tableland (above 2,000 ft.) and Lee has recorded it from altitudes up to 5,800 ft. in New Guinea. *A. annulipes* was widespread, and its larvae were dominant in open forest country, being present up to 3,000 ft., but rare in parts of Cairns city favoured by *A. farauti*. They were found in isolated pools. *A. amictus amictus* was found throughout the area except at very high altitude on the tableland, and was common at Townsville, where larvae were frequent on the edges of fresh-water swamps. Water with a heavy clay suspension and frequently foul from pollution seemed to be preferred. Larvae of *A. amictus hilli* were seen only in sunlit, brackish, sometimes much polluted, swamps along the coast. This variety sometimes attained pest proportions. Larvae of *A. meraukensis*, Venhuis, were apparently widely distributed on the coastal plain, but were never numerous. *A. b. bancrofti* was common on the coastal plain, particularly near Cairns, but rare on the tableland. Larvae were never numerous in any particular pool. *A. stigmaticus*, Skuse, bred in shaded, clear, cool rock-pools up to altitudes of 3,000 ft., but did not occur in the coastal plain. *A. atratipes*, Skuse, was seen only on the tableland. *A. novaguinensis*, Venhuis, and *A. powelli*, Lee, have been recorded in northern Queensland, but were not seen by the author.

Observations over 18 months indicated a definite seasonal succession of the commoner Anophelines. *A. amictus hilli* was dominant for the first two months of the year, then *A. farauti* until about June. *A. annulipes* followed and finally *A. Amictus amictus*. This succession is considered to be associated mainly with changing conditions of humidity brought about by the seasonal distribution of rainfall. Malaria transmission in the district is discussed, and it is suggested that *A. farauti*, which is there relatively zoophilous, can be associated with epidemics only in seasons when it is particularly abundant and remains so for a long time and that epidemic years are characterised by a prolonged wet season and relatively mild winter.

BRENNAN, J. M. **The Occurrence of *Anopheles crucians* in Guatemala.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 138.

In 1942, KUMM described the presence of *Anopheles crucians* in Nicaragua [this *Bulletin*, 1943, v. 40, 359]. He gave the localities in Central America where this species has been found, all of which are on the Atlantic slope. The

present author, in finding the species in Guatemala, extends the distribution to the Pacific slope, and records its presence in Guatemala for the first time.

The observations were made from November 1949 to May 1950. *A. crucians* was found breeding prolifically as the dominant species with *A. albimanus*, *A. argyritarsis* and *A. hectoris* in a semi-permanent marsh in the narrow valley of the Michatoya River, 4 miles south of Amatitlan, at about 3,500 feet. This approximates the southern-most extension of the species reported by Kumm from Nicaragua. The vegetation is very dense and so high that the water is difficult to see and to reach. Although there are a few hot springs in the immediate surroundings, the water of the marsh is definitely cold.

As the dry season progressed, the associated species could no longer be found, but *A. crucians* continued to breed with no apparent reduction in numbers, so that the species may well have been well established in the area for some time. *H. J. O'D. Burke-Gaffney*

DE BUSTAMANTE, F. M. & GUEDES, A. S. Armadilha "Dawn Trap" de Shannon. Do seu emprêgo para a captura do *A.* (*N.*) *darlingi* em Engenheiro Dolabela, Minas Gerais. [**The Shannon Dawn Trap for collecting *Anopheles darlingi* in Engenheiro Dolabela, Minas Gerais.**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1950, Oct., v. 2, No. 4, 326–7.

The English summary appended to the paper is as follows :—

"The authors present the results of their observations with Shannon's dawn trap for the capture of *A.* (*N.*) *darlingi* in Engenheiro Dolabela, county of Bocayuva, State of Minas Gerais. Out of 2,397 anophelines caught in a single trap during the period from January to April included, 1950, 2,157 (89·99 per cent.) were *darlingi*. The average number of *darlingi* per capture was 10,271."

RACHOU, R. G. & NETO, J. A. F. Da presença do *Anopheles* (*Kerteszia*) *bambusicolus* Komp, 1937 no Estado de Santa Catarina (Brasil). [**Presence of *A. bambusicolus* in the State of Santa Catarina, Brazil.**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1950, Oct., v. 2, No. 4, 303–5.

The English summary appended to the paper is as follows :—

"The authors report the finding of *A* (*K*) *bambusicolus* in Brusque (Santa Catarina State—Brazil), in a very low incidence : 0·002% among 49,900 adult anophelines identified. This is the second time that this species is found in Brazil ; the first one was in Londrina (Paraná State)."

SERGENT, Ed. & PARROT, L. **Premunition in Bovine Piroplasmosis and Human Malaria.** *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 329–30.

SWELLENGREBEL's paper [this *Bulletin*, 1950, v. 47, 1053] on the host-parasite relationship in malaria stimulated these authors to summarize the results of their researches in Algeria on human and avian malaria and on bovine piroplasmosis. The latter is a disease which affects European and African calves alike ; both are equally susceptible and both progress to a condition of premunition in the adult. It is stated that a certain number of the indigenous cattle acquire the infection *in utero*, and that the newborn animals are in a state of acquired prenatal premunition. A similar situation exists among the imported and indigenous people of North Africa in regard to malaria ; the toddlers become severely infected, and the survivors acquire premunition.

A new inoculation provokes a mild reaction or none at all in such populations. If, however, malaria is eradicated, they become liable to the disease, and thus malaria control may be a " two-edged sword ". *P. C. C. Garnham*

TELCHAROV, L. & TODOROWA, Maria. Le foie des paludéens. (Étudié sur 45 cas au moyen de ponctions-biopsies.) [**The Liver in Malaria : Study of 45 Patients by Hepatic Puncture.**] *Semaine des Hôpit. de Paris.* 1950, June 10, v. 26, No. 43, 2072–5, 5 figs. [12 refs.]

The authors report the results of an investigation carried out in Plovdiv, Bulgaria, during the course of which they examined material obtained by hepatic puncture from 45 patients suffering from *P. vivax* malaria. They describe the tissue changes resulting from the infection, the evolution of such changes (ascertained by repeated punctures), and the discovery of forms of the malaria parasite in the liver.

In primary infections the mesenchyma shows hyperaemia of the periportal veins and of intertrabecular sinuses. There is a perivascular lymphoid infiltration in the periportal areas, without pigment or parasites in the cells, and with a marked tendency to fibrosis. There is but little mobilization of Kupffer cells. The intertrabecular cell mobilization of the mesenchyma shows signs of parasitophagy. The Disse spaces, and to a less degree the periportal spaces, contain serous exudate which may be haemorrhagic, and which presses on surrounding tissue.

The parenchyma shows in places a lessened glycogen content, a marked reduction of biliary pigment, and small collections of iron pigment ; neither malaria pigment nor parasites can be seen. Capillaries and biliary vessels are slightly dilated.

Successive punctures show that the cells mobilized in the periportal areas and in the intertrabecular spaces do not increase in number but fibrous elements or symblasts appear. Parasites are found in red blood cells and in monocytes. Kupffer cells, generally charged with malaria pigment, may be atrophied or hypertrophied with a tendency to erythrophagy. In three cases fibro-monocytic nodules were found either in the Kiernan spaces or in the middle of a lobule. The presence in these nodules of giant cells, generally charged with malarial pigment, and the polymorphism of the monocytes and fibroblasts, present a certain analogy with the structure of Hodgkin's granuloma.

Changes in the parenchyma of the liver in relapsing malaria are hypotrophic and degenerative. There is marked fatty infiltration of the lobules.

In relapsing malaria parasites in red cells and gametocytes are found much more frequently in smears made from liver puncture material than in the peripheral blood, whereas in the same cases during the primary attack the frequency of parasites in peripheral and liver blood respectively is strictly comparable.

In cases of clinically serious malaria parasites were found in histiocytes which showed marked degenerative changes. In mild cases healthy histiocytes display parasitophagic activity.

The authors have never seen parasites in the parenchymatous cells of the liver comparable with the forms described by SHORTT and GARNHAM. In the examination of 412 serial sections of an infected monkey's liver they found two giant schizonts (16 and 30 μ). In one human case they found a solitary giant schizont (42 μ). They attribute the giant size of these schizonts in parenchymatous cells to the high glycogen content of the medium in which the parasite develops.

The observations do not support the assertions of SHORTT and GARNHAM that relapses are solely dependent on exo-erythrocytic schizogony in the parenchymatous cells of the liver. *Norman White*

PIZZILLO, G. La splenocontrazione terapeutico-diagnostica (Sviluppo, portata e sue applicazioni). [**Contraction of the Spleen for Purposes of Treatment and Diagnosis (Development and Extent of its Uses).**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1950, Nov., v. 31, No. 11, 829–39. [28 refs.] English summary.

About 20 years ago, ASCOLI introduced the use of adrenaline in the treatment of enlarged spleens due to chronic malaria ; this hormone causes the enlarged spleen to contract. In due course the spleen expands again without altogether fully resuming its previous size ; in this way the size of the spleen can be gradually reduced. Side by side with this treatment cycle of alternate contractions and re-expansions of the enlarged malarial spleen there is a reappearance of pyrexia, though the subject may until then have been enjoying a long period of freedom from fever. Under this sort of physical exercise the spleen is " toned " up and its periodic contractions and gradual return to normal size may continue after the adrenaline treatment has been stopped.

The adrenaline treatment has later been applied with success to acute malarial infections. In these, Pizzoli has recognized " focal " (in, or outside, the spleen) and " septicaemic " phases, and adrenaline acts by driving the parasites out of the shelter of the spleen and exposing them to the destroying action of both quinine and the blood serum itself. Indeed, this synergic action of adrenaline and quinine has shown that many cases which had been thought to be quinine-resistant can be successfully cured by reducing the quinine dosage and adding adrenaline to the treatment.

In malignant malaria, the parasite shelters in the blocked capillaries of various organs and other tissues and can be driven out into the bloodstream and exposed to the plasmodicidal drug when adrenaline is used to cause contraction of the walls of the blocked capillaries.

Pizzoli also claims that small doses of quinine can be used with success if combined with adrenaline treatment in such conditions as blackwater fever, Bright's disease, pregnancy, which have been considered to contraindicate the classic antimalaria drug in its more commonly used doses. He has found this synergic action of adrenaline to be also useful when combined with the appropriate specific treatment of a number of other diseases such as leishmaniasis, trypanosomiasis, schistosomiasis and many others.

The diagnostic value of Ascoli's adrenaline reaction on the spleen has been often demonstrated in cases of malaria which were simulating such surgical conditions as appendicitis, cholecystitis and other " acute abdomens."

J. Cauchi

COATNEY, G. R., COOPER, W. C. & YOUNG, M. D. **Studies in Human Malaria. XXX. A Summary of 204 Sporozoite-Induced Infections with the Chesson Strain of** *Plasmodium vivax*. *J. National Malaria Soc.* 1950, Dec., v. 9, No. 4, 381–96, 3 figs. [21 refs.]

In the course of studies carried out in two Federal penal institutions (reports of which have been summarized in this *Bulletin*) 204 volunteers developed overt malaria as the result of infection with mosquitoes carrying the Chesson strain of *P. vivax*. These volunteers were under observation for 18 months. This paper gathers together the most important data regarding these infections. The authors' summary and conclusions read as follows :—

" When ten mosquitoes were used to transmit the infection, the prepatent and incubation periods averaged 11·8 and 12·1 days respectively, as compared to 14 days for each period when the infection was induced by one mosquito bite.

"No long-term latent period has been demonstrated for this strain.

"When acute attacks were allowed to go untreated, the parasitemia persisted for variable periods, eventually becoming intermittently patent and finally disappeared altogether.

"Infections induced by the bites of 10 infected mosquitoes, a relatively heavy inoculum, showed recurrent acute attacks for three to 16 months, when each attack was treated by a non-curative drug. The intervals between treatment to relapse usually became progressively longer as the infection advanced.

"Infections induced by one infected mosquito exhibited shorter courses and fewer relapses.

"Suppressive drugs such as quinacrine, chloroquine, chlorguanide and SN 10,751 completely suppressed the parasites and symptoms of infections induced by the bites of 10 infected mosquitoes, during the period of drug administration and for varying lengths of time thereafter. The evidence shows that a greater suppressive dose is needed for persons receiving a large inoculum of malaria sporozoites than for those receiving a small inoculum.

"Of the drugs used in these experiments only certain 8-aminoquinoline derivatives (pentaquine, isopentaquine and analogues) consistently reduced the relapse incidence and total duration of infections. This was not true of controls treated with 'non-curative' drugs such as quinine, chloroquine, SN 10,751 (Camoquin) and chlorguanide.

"In patients where the first relapses were not treated the parasitemia was patent for several months, showing cyclic rises and falls with progressively declining peak parasite densities. In patients where later relapses were not treated, similar results were obtained except that the duration of the parasitemias was shorter and lower densities prevailed.

"The evidence indicates that the Chesson strain of *Plasmodium vivax*, when induced by mosquito bites, can exist in the body for as long as 18 months, during which time there is a fairly periodic invasion of the erythrocytes by parasites arising from the fixed tissue. The duration of the infection and the number of relapses appear to be related directly to the size of the inoculum; consequently, the length of time that drugs must be given to suppress the disease is also related to the size of the inoculum.

"This study has re-emphasized the variability of the behaviour of vivax malaria under conditions where many factors were controlled. Under uncontrolled natural conditions, the pattern of relapsing vivax malaria certainly can be more complex." *Norman White*

FLETCHER, E. **An Adreno-Renal Syndrome in Malignant Tertian Malaria.** [Memoranda.] *Brit. Med. J.* 1951, Mar. 31, 680.

The case is recorded of a man of 41 who, having lived in West Africa with impunity for 20 years, was apparently infected by a different strain of *Plasmodium falciparum* when flying home to Co. Down in August 1950.

Within a few weeks of his arrival he developed a state of uraemia which is attributed to a heavy *P. falciparum* infection. His illness was diphasic, beginning with a stage of serious peripheral vascular failure, which was followed by uraemia.

In the first stage, the patient complained of severe pain in the arms. The whole body, especially the limbs, was cold and sweaty and the right arm joints were swollen and painful. The pulse and blood pressure could barely be recorded. There was no albuminuria. The heart and lungs were normal.

The day after he was first seen, the patient passed into deep coma. An extensive haemorrhagic rash developed on the limbs and in the folds of the groins. Oliguria was marked and the urine was loaded with albumin. The

blood urea was 120 mgm./100 ml. Blood films showed the presence of accolé forms of *P. falciparum* and numerous gametocytes. No other parasites were found. There was a moderate anaemia. Although albuminuria was present, there were no casts or blood elements in the urine. Agglutination tests for rickettsiae, salmonella organisms and leptospires were negative.

Proguanil, 200 mgm. was given daily. Within a week, the temperature had settled, urinary output was normal, albuminuria had disappeared and no more malaria parasites were found. Subsequent tests showed normal kidney function with good concentration power.

Because of the complete recovery, the dramatic response to proguanil and the exclusion of other likely causes, it is assumed that the renal damage was due to the heavy malarial infection. The author notes that the first phase resembled an acute hypoadrenalism. There were no urinary changes and the joint manifestations are of interest because of the relation of arthritis to the adrenal glands.

It is suggested that the second stage may have been due either to (1) a true glomerulo-nephritis or nephrosis from actual involvement of the kidney by the malarial infection or (2) a dynamic disturbance of renal function as a result of the initially very low blood pressure. The absence of red blood cells or casts do not support the first suggestion. On the other hand the marked and persistent hypotension would be sufficient to cause the second phase of the illness. The dynamic theory is also supported by the fact that the albuminuria of sharp onset cleared up abruptly with treatment and no evidence of renal disease was present a few weeks later. *H. J. O'D. Burke-Gaffney*

MOST, H. **Recent Advances in the Therapy of the more Common Protozoan and Helminthic Infections of Man.** *J. Trop. Med. & Hyg.* 1950, July, v. 53, No. 7, 145–56, 4 figs. [19 refs.]

When the pharmacology of atebrin [mepacrine] was investigated the reason for the relatively poor immediate effect on malaria parasites became apparent. The initial small doses were found to be localized in the tissues leaving little in the plasma to exert a chemotherapeutic effect, but ultimately with continued administration plasma levels were achieved and a satisfactory clinical result obtained. Thus 1 gm. given in divided doses during the first twenty-four hours, followed by 0·3 gm. daily for the next six days, provided average daily levels of 41 to 52 microgrammes per litre from the second to eighth day of treatment and higher levels during the first twenty-four hours. A rational basis for the optimum use of atebrin resulted in the schedule of 2·8 gm. in seven days. Atebrin in this schedule is better than quinine in the control of fever, parasitaemia and interval to relapse, and the results have been summarized by MOST and HAYMAN. Within 12 hours after the first dose of atebrin some patients had negative smears and by 96 hours virtually all were clear. With quinine, on the other hand, only 7 per cent. were parasite-free at 24 hours, and about a fourth still had parasites at 96 hours. In a few, parasites persisted for 132 hours.

Atebrin and quinine are equally effective in relapses. On the whole atebrin affords a significantly longer symptom-free interval than quinine.

Of the 4-amino-quinolines the drug which has been most studied is chloroquine. From the pharmacological aspect it behaves very much like atebrin except that it persists much longer in the body. Plasma levels in the range of 10 microgrammes per litre are effected with relatively small doses by the mouth. As a result it is possible to maintain effective suppression by single weekly doses of the drug and to accomplish satisfactory termination of attacks by treatment schedules of one to four days.

In all respects it is decidedly less toxic than either atebrin or quinine.

During the first 48 hours chloroquine is definitely more active than either quinine or atebrin. It controls fever more promptly than either quinine or atebrin in primary attacks. With regard to the interval to relapse after treatment, only 1 per cent. of chloroquine-treated patients had another attack within 40 days after treatment, whereas 67 per cent. and 28 per cent. relapsed after quinine and atebrin. Short-term relapses are virtually abolished with chloroquine.

On the 8-aminoquinolines and the cure of *P. vivax* malaria clinical studies were not commenced until late in the war. Long before the beginning of hostilities it had been shown in India that quinine and plasmoquine given concurrently favourably reduced the relapse rate in *P. vivax* malaria. However, plasmoquine was considered by many too toxic for extensive routine application.

Following the demonstration of curative properties of combined quinine-plasmoquine therapy in volunteers with mosquito-induced *P. vivax* infections in the United States, a clinical study at Moore General Hospital in the U.S.A. was reported by Most and colleagues in November 1946. Approximately 100 patients have been treated and adequately followed. Clinical relapses occurred in only 4 per cent. of treated patients compared with relapses of 80 and 90 per cent. for similar groups treated with quinine, atebrin, chloroquine and other drugs. Each dose of quinine was 0·6 gm. and each dose of plasmoquine was 0·02 gm. of the naphthoate. Both were given together at eight-hour intervals for 14 days.

More active and less toxic 8-aminoquinolines—pentaquine and iso-pentaquine—have been studied by Alving *et al.* [this *Bulletin*, 1948, v. 45, 953]. More than 500 veterans with relapsing *P. vivax* malaria have been treated with 10 mgm. of pentaquine base and quinine at eight-hour intervals for 14 days. Straus and Gennis [*ibid.*, 974] had only one failure in 50 patients so treated. It is therefore now possible to suppress, treat and cure malaria.

In *amoebiasis* the number and diversity of drugs in use for treatment is ample evidence of the desirability of having more effective amoebicidal agents than are now available.

Of emetine it should be noted that not a single death from this drug was reported during the last world war. The indiscriminate use of this drug should not be encouraged, but many of the serious reactions described have resulted from large doses and prolonged therapy. In clinically severe amoebiasis, with extensive or slowly healing ulcers or well-established caecal deformities, or granulomas, retention enemata of chiniofon are considered valuable adjuncts to simultaneous oral iodoquinoline and parenteral emetine therapy. It must be confessed that the vogue in the treatment of amoebiasis is to use *all* available drugs, either simultaneously, or serially and in rotation for several courses. In this way it is hoped to overcome the shortcomings of any one agent.

Carbarsone, like diodoquin and chiniofon, has been widely accepted in many parts of the world. The cure rates are considered to be approximately those of the iodoquinolines. The original dosage is 0·25 gm. twice daily for ten days either before or after the iodoquinolines. During the war and since daily doses of 1 gm. have been used without toxicity.

Recently a group of thioarsenites have been found which are superior to carbarsone on the basis of observations in monkeys and human beings.

Wia (or Milibis) is a drug containing bismuth and arsenic in organic form, and was first reported on by Hauer (1943). When given alone or in combination with chiniofon in troops of the Africa Korps it was said to eliminate cysts from the stools promptly, but to be unsatisfactory in acute virulent infections. Berberian (1948) reported cure of 24 out of 25 patients treated with Wia alone. No side-effects are reported.

Of chloroquine, CONAN [this *Bulletin*, 1948, v. 45, 430] demonstrated that it had a moderate degree of amoebicidal activity in intestinal infections. In a series of 32 patients treated with 0·3 gm. of base for 21 days and adequately followed after treatment, cures were effected in 50 per cent. Under the heading of antibiotics we may note that DWORK [*ibid.*, 1005] reported apparent cure of 4 out of 9 patients with intestinal amoebiasis treated with para-aminobenzoic acid. The fact that this drug possesses some activity is important from the standpoint of the possible antibiotic mode of action of other agents.

In the efforts to culture *Entamoeba histolytica* free of bacteria some progress has been made with heat-killed filtrates and dead bacteria, along with the use of penicillin and streptomycin in cultures. Bacitracin was studied in FAUST's laboratory at Tulane and found to inhibit or kill amoebae to a greater degree than the accompanying bacteria. LONGACRE in Louisiana then treated patients with amoebic dysentery orally, using bacitracin in divided doses, and noted excellent clinical response and rapid healing of ulcers in some. In New York, Most and his colleagues have confirmed these observations in acute clinical cases and in non-symptomatic carriers, with total daily oral doses of 40,000 to 160,000 units for 10–20 days. Apparently bacitracin is not absorbed and no significant toxic symptoms have been noted. Up to date more than 50 patients have been treated and cure rates of 60 to 80 per cent. are possible on the basis of mean observation periods of six months after therapy.

In some severe cases of dysentery amoebae reappear in the stools days or months after therapy has been completed, but the patient has no demonstrable lesions and is symptom-free. Treatment with bacitracin results in disappearance of Gram-positive organisms and anaerobes from the stools. It may be that the bacteria enlarge the initial lesions caused by *E. histolytica* or furnish essential metabolites for its growth and virulence.

The remainder of this extensive survey concerns helminthic infections and therapeutic applications which are sufficiently appreciated and well known to readers of this *Bulletin*. *P. Manson-Bahr*

WINCKEL, C. W. F. De kinacultuur in Indonesië. [**The Cultivation of Cinchona in Indonesia.**] *Med. Maandblad.* Djakarta. 1950, Dec. 1, v. 3, No. 12, 443–51, 2 pls.

GEUKENS, A. Proefnemingen met Paludrine. [**Experiments with Paludrine.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Sept. 30, v. 30, No. 3, 429–40.

The author records the results of prophylactic and curative treatment of children [presumably in the Belgian Congo] with paludrine [Proguanil].

In infants up to 2 years old from an endemic area, paludrine given prophylactically twice a week (0·025 gm. x 2) did not eliminate the parasites completely but considerably reduced the infection and curtailed the paroxysms of fever. In older children, the same results were obtained with a weekly dose of 0·1 gm. paludrine. In a hypo-endemic area, the results of administration of two doses a week were also satisfactory but the administration of a single dose was less favourable. In a hyperendemic area, treatment of infants with two doses a week and of older children with one weekly dose were both effective.

Paludrine proved to be equally active against the malignant tertian and the quartan parasites, though in neither case did it produce complete sterilization of the blood in the doses mentioned. Used therapeutically, paludrine completely suppressed the fever in the 3rd or 4th paroxysm. In the case of *Plasmodium falciparum*, the parasites were either eliminated entirely or became scanty by the 3rd day, while in the case of *P. malariae*, the schizonts disappeared much more slowly, and could still be detected between the 10th and 15th days. The

drug had no effect upon the gametocytes, for their number continued to increase in both species of parasites, whereas division forms gradually disappeared in the course of treatment. *C. A. Hoare*

GUNTHER, C. E. M. **Proguanil Hydrochloride (Paludrine) in the Prevention and Treatment of Malaria in New Guinea.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Feb., v. 44, No. 4, 473–8.

This paper is concerned with the prophylaxis and treatment of malaria among the employees of a gold dredging company operating in the Bulolo River Valley, a hyperendemic malarious locality in New Guinea. In this region, 60 per cent. of infections are said to be due to *Plasmodium falciparum*, the remainder to *P. vivax*.

Until 1941 the European population took 330 mgm. (5 grains) of quinine sulphate daily, the average monthly attack rate being 2·4 per cent. In 1942 the station was totally destroyed, and when reconstruction started in 1946 mepacrine was used for suppression ; conditions were, however, unstable, and only about 50 per cent. took the drug daily. During this period the attack rate averaged 6·9 per cent. From May to October 1947 all Europeans received 100 mgm. proguanil twice weekly and the attack rate fell to 0·42 per cent. From November 1947 to November 1949 the same dosage was given thrice weekly, and the incidence of overt malaria was further reduced to 0·12 per cent. Case reports are given of 7 instances in which proguanil failed to protect persons who were able to satisfy the author that they had taken proguanil regularly. Five of these were on a régime of 100 mgm. twice weekly, the other two on one of 100 mgm. thrice weekly. All the seven infections were with *P. vivax*.

For treatment of the attack, proguanil in doses of 100 mgm. thrice daily proved too slow in action for both *vivax* and *falciparum* infections, fever persisting until the third to the fifth day and the patient being incapacitated for at least 5 days. A combination of 100 mgm. proguanil and 330 mgm. quinine bihydrochloride thrice daily, however, elicited prompt response, pyrexia rarely persisting for more than 24 hours and the patient usually being fit to resume work after 48 hours. The treatment was continued over a period of 5 days. There was no means of assessing radical cure, as all patients were immediately placed on suppressive proguanil on completion of treatment.

For the indigenous population, who possess a high degree of tolerance to malaria, a three-day routine treatment, consisting of 100 mgm. proguanil twice daily for two days and once on the morning of the third day, was found effective in both *falciparum* and *vivax* infections.

The author concludes that proguanil is a satisfactory suppressant of the species of malaria parasite prevalent in New Guinea. It is also adequate for the therapeutic treatment of malaria among the indigenous population, but needs reinforcement with quinine to produce optimum results in non-immune Europeans. *G. Covell*

KSHATRIYA, K. C., PATEL, S. R. & NARGUND, K. S. **Acridine Derivatives as Antimalarials. Part VI. 5-dialkyl amino alkyl amino Derivatives of 3-7-dimethoxy-8-chloro, 7-methoxy-8-chloro and 7-methoxy-2-8-dichloro acridine.** *J. Univ. of Bombay.* Sect. A. Physical Sci. 1950, Nov., v. 19, Pt. 3, 69–72.

IMBODEN, C. A., Jr., COOPER, W. C., COATNEY, G. R. & JEFFERY, G. M. **Studies in Human Malaria. XXIX. Trials of Aureomycin, Chloramphenicol, Penicillin, and Dihydrostreptomycin against the Chesson Strain of *Plasmodium vivax*.** *J. National Malaria Soc.* 1950, Dec., v. 9, No. 4, 377–80.

COATNEY and his colleagues found that aureomycin was effective against *P. gallinaceum* infections in the chick and that a dose of 8 gm. of aureomycin a

day for one week delayed the onset of clinical attacks of Chesson strain *P. vivax* malaria in human beings for two or three weeks, and had a slight effect against erythrocytic parasites [this *Bulletin*, 1950, v. 47, 438, 444]. Those observations prompted the experiments here reported.

Ten volunteers at the Federal Correctional Institution at Seagoville, Texas, were each bitten by ten mosquitoes heavily infected with Chesson strain *P. vivax*. The drug under trial was given on the morning of the day of infection and on each of the six following days. Two men received aureomycin, 4 gm. a day (0·5 gm. every 3 hours). Two men received chloramphenicol in similar doses. Two men were given 500,000 units of penicillin G every 12 hours, intramuscularly, 1,000,000 units a day. Two men were given 2 gm. dihydrostreptomycin hydrochloride a day, 1 gm. intramuscularly every 12 hours. Two men were untreated controls.

The incubation periods in the aureomycin-treated patients were 27 and 29 days as compared with 14 and 11 days in the controls. In the chloramphenicol-treated men the incubation periods were 23 and 18 days. Neither penicillin nor dihydrostreptomycin had any effect on the duration of the incubation period which varied from 11 to 14 days in the four men.

In all ten acute attacks parasitaemia was controlled with chloroquine followed by the drug regimen which had been used in the attempted protection of the patient. In all cases relapses occurred at intervals not differing significantly from those in the controls treated with chloroquine alone. "At the end of six months there was no evidence that the courses of antibiotics had reduced the relapse potential of any case." *Norman White*

YANG, S. T. Les antimalariques naturels chinois. [**The Natural Antimalarials of China.**] *Rev. Paludisme et Méd. Trop.* 1951, Feb. 15, v. 9, No. 81, 29–35. [15 refs.]

The following is a translation of the author's summary :—

In China, there are six medicinal plants capable of having antimalarial activity ; these are *Fraxinus malacophylla* Hensl, *Fraxinus chinensis* Roxbg, *Clerodendron yunansis* Hu, *Alstonia yunansis* Diel, *Dichroa febrifuga* Lour and an unidentified species. *H. J. O'D. Burke-Gaffney*

MORIN, H. G. Moustiquaire chimique et paludisme rural. [**Insecticides and Rural Malaria.**] *Bull. Soc. Path. Exot.* 1950, v. 43, Nos. 11/12, 747–53.

The author contrasts the various tactics used in the control of malaria in the last half century. The method of species sanitation, aimed at control of a limited number of anopheline species, has not been practically applicable in the Mediterranean region, where chief reliance was for a long time placed on the use of drugs. The advent of the residual insecticides has now provided a means of control which is applicable to this region and which is far superior to any other. A general account is given of the way in which DDT is used.
G. Macdonald

RACHOU, R. G. & DE MELLO, P. J. Uma prova experimental de aplicação de larvicida por avião em um braço morto do Rio Iguaçu, em São Bento. [**Experimental Application of a Larvicide from the Air in a Breeding Place on the River Iguaçu, São Bento.**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1950, Oct., v. 2, No. 4, 339–44. English summary (9 lines).

The authors in Brazil applied DDT powder from the air as a larvicide to a breeding place of *Anopheles aquasalis*, by the River Iguaçu in Sao Bento. The preparation used was "Gyron" (Geigy), a fine powder containing 10 per cent. DDT. It was used at a dosage of 0·025 gm. per sq. m.

Partial control was obtained after 24 hours against third and fourth stage larvae, but none was achieved against the first and second stage larvae or pupae.

There was no residual larvicide effect : larval density in the breeding place was 62·4 per cent. higher 96 hours after dusting.

Technically, application from the airplane was very good : a dosage of DDT of 0·022 gm. to 0·023 gm. per square metre was obtained.

H. J. O'D. Burke-Gaffney

WALLACE, R. B. **Further Observations on Insecticides and** *A. maculatus*. *Med. J. Malaya*. 1950, Dec., v. 5, No. 2, 115–39, 1 fig.

The author has investigated the behaviour and subsequent mortality of mosquitoes (mainly *A. maculatus*) entering trap huts measuring $8 \times 7 \times 4\frac{1}{2}$ feet. The mosquitoes were expected to enter through funnel-type slits, but apparently they mainly entered by the door, attracted by light. Up to midnight and after 5 a.m. there were 4 observers per hut watching the insects ; between these times there were two sleepers. One of the huts was treated with DDT (in kerosene solution for the first tests ; later scrubbed and re-treated with DDT paste). After some time in the hut, the mosquitoes could escape (*via* another funnel) to a smaller cage, attracted by a dim light ; but few did so, and usually they were artificially transferred to the small cage for observation on lethal effects.

There were nearly always more mosquitoes in the untreated than in the DDT-treated hut, despite the fact that their positions were changed several times. This was observed after all smell of kerosene had disappeared. Mosquitoes entering the DDT hut tended to attempt to feed on the men inside at once, without first resting on the walls, as they did in the control cage. After feeding they rested little in the DDT cage, but continually flew about, touching the walls occasionally, apparently trying to escape.

Mosquitoes from the DDT hut died after periods from 3 hours to 30 hours, nearly always before those from the control hut, which usually died between 30 and 98 hours after capture.

Several hundred mosquitoes, marked with gold dust, which were put into a DDT-treated cage for $\frac{1}{2}$ hour and then released, were not captured again. This contrasts with some earlier experiments (before DDT) in which 2 to 5 per cent. of mosquitoes released up to $1\frac{3}{8}$ miles from labourers' lines were recaptured in the lines subsequently.

It appears that the author also carried out laboratory tests in exposing mosquitoes to panels treated with gamma BHC. This proved to be more rapid in action than DDT and also did not have an irritant effect on the mosquitoes. He considered it more promising for control of *maculatus*.

[This paper is written rather unsystematically and the tables are difficult to compare with the text. No dosages of the insecticides are given.]

J. R. Busvine

HUFF, C. G. **Observations on the Pre-Erythrocytic Stages of** *Plasmodium relictum*, *Plasmodium cathemerium*, **and** *Plasmodium gallinaceum* **in various Birds.** *J. Infect. Dis.* 1951, Jan.–Feb., v. 88, No. 1, 17–26. [10 refs.]

This paper is the result of further study of pre-erythrocytic schizogony of three avian malaria parasites, *Plasmodium relictum*, *P. cathemerium* and *P. gallinaceum*. The author employed the same methods as before, but in these experiments extended his observations to a wider range of birds. Cryptozoites of *P. relictum* were found in the turkey, pheasant, duck and pigeon as well as in the well-known host, the canary, but parasitaemia developed only

in the canary and to a slight degree in the pigeon (in the dove a sub-patent infection was demonstrated). In the pheasant, natural immunity appeared to limit development of this species to the first pre-erythrocytic generation, no metacryptozoites being observed. Cryptozoites of *P. cathemerium* were found in the duck and of course in the canary ; in the latter their morphology is described for the first time in some detail—it is much the same as that of *P. relictum*, though the number of merozoites is perhaps greater (35). Cryptozoites of *P. gallinaceum* were found in the turkey, pheasant, duck, goose, canary and in the usual host the chicken ; they were somewhat surprisingly absent in another gallinaceous bird, the California valley quail. Parasitaemia developed in the chicken and to a slight extent in the pheasant and pigeon though no tissue stages were seen in the last. In addition there was sub-patent infection in the duck and guinea-fowl. In these various highly artificial host-parasite combinations, pre-erythrocytic stages were found in 62 per cent., while erythrocytic stages were found only in 29 per cent.

There is a special note on the early localization of *P. gallinaceum* in the tissues of the chick, following intravenous inoculation of sporozoites from large numbers (100–300) of mosquitoes. In spite of the large inoculum, no parasites were found at 24 or 26 hours, but after 36 hours (*i.e.*, after the maturation of the cryptozoic generation) they were found in all organs except the bone-marrow. [Earlier experiments had revealed the presence of cryptozoites in the spleen following intravenous inoculation of sporozoites.] If the inoculation is made locally into the skin (as in experiments with *P. cathemerium*) concentration of parasites is considerable, and cryptozoic forms are readily found in macrophages and fibroblasts on the periphery of the discrete mass comprising salivary glands and phagocytes.

Abnormal pre-erythrocytic forms (all of the same type) were found (*a*) in infections in abnormal hosts, (*b*) in hosts immunized by previous infection and (*c*) after exposure to antimalarial drugs.

[The author concludes with a discussion in which he tries to substantiate further his theory (*Quart. Rev. Biol.*, 1938, v. 13, 196–206) regarding the evolution of malaria parasites in relation to their invertebrate hosts. He points out here that the cleft formation present in the tissue forms of the avian parasites resembles the cytomeres of *Leucocytozoon* and thus indicates a close relationship between these two genera transmitted by orthorrhaphous Diptera. But cytomere formation is even more definite in *Haemoproteus* which is transmitted by insects belonging to a distant sub-order.] *P. C. C. Garnham*

BEN-HAREL, S. **The Phagocytic Activity against *Plasmodium lophurae* of Macrophages from Ducks of varying Degrees of Natural Resistance to this Parasite.** *Amer. J. Hyg.* 1951, Jan., v. 53, No. 1, 1–10, 6 figs. on pl. [13 refs.]

Some ducks are more resistant to infections of *Plasmodium lophurae* than others. Experiments were devised to determine some of the factors concerned. Macrophages in tissue culture were grown from the buffy coat of duck blood, either homologous or hyperimmune heterologous serum was added and finally heparinized duck erythrocytes, infected with *P. lophurae* (about 20 to 100 million parasites in each Carrel flask) were introduced. The cultures were incubated overnight at 37°C. and after they were washed with Tyrode's solution they were fixed with Zenker's formalin solution. The mounts were stained with Giemsa stain and the proportion of macrophages containing 5 or more clumps of pigment was determined. Two kinds of sera were tested, (1) from 13 naturally resistant ducks, and (2) from 6 non-resistant ducks. Phagocytic activity was determined in the presence of (*a*) the homologous serum, (*b*)

hyperimmune heterologous serum, and (*c*) in one experiment, serum from a highly susceptible duckling. Serum from resistant ducks and from hyperimmune ducks gave rise to about the same degree of phagocytic activity; phagocytosis was slightly less in the non-resistant adult ducks; the serum of the duckling proved to be completely inactive even though the macrophages came from a resistant bird. It is thus "opsonins" in the serum which are the essential factor in phagocytosis—they exist equally in naturally resistant and in hyperimmunized birds. *P. C. C. Garnham*

Becker, E. R. & Schwink, T. M. **Sparing and Protective Effects in Ducklings of Chick Plasma on Chick Erythrocytes parasitized with** *Plasmodium lophurae*. *Ztschr. f. Hyg. u. Infektionskr.* 1950, Oct. 31, v. 131, No. 6, 614-16.

In a previous paper [Becker *et al.*, *Iowa State College J. Sci.*, 1949, v. 23, 323], it was shown that, in chicks infected with duck erythrocytes harbouring *Plasmodium lophurae*, the latter are protected against the defence mechanism of the host by injection of duck plasma. In the present paper an account is given of experiments to test the effect of chick plasma on the infection of ducklings with a chick strain of the parasite.

From 0·8 to 1·0 ml. of heparinized plasma of chicks, which had recovered from an infection, were injected intravenously into ducklings 4 days in succession. After 75 minutes following the first plasma injection, the ducklings were inoculated with washed parasitized cells of a heavily infected chick. In control ducklings, the inoculation of parasites was either not preceded by injection of plasma, or the latter was substituted by saline. The results of the experiments were determined by examination of stained blood films, while the significance of differences was assessed by the Fisher small sample method.

In control ducklings, the parasitized chick cells disappeared from the circulation within 1 hour, whereas in those with chick plasma a fair number escaped destruction and could be detected within this period of time. After several days, the number of parasites present in the control ducklings was appreciably higher than in those which received plasma. From these observations it is concluded that immune chick plasma at first had a sparing action on parasitized chick cells, and subsequently produced a protective effect against the infection. However, the protective action of chick plasma in ducklings was not so great as that of duck plasma in chicks. *C. A. Hoare*

BLACKWATER FEVER

Vandepitte, J. M. Le facteur Rhésus et sa relation avec la fièvre bilieuse hémoglobinurique. [**The Rh Factor in relation to Blackwater Fever.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Dec. 31, v. 29, No. 4, 501–7. [20 refs.]

The author gives details of four cases of blackwater fever in Rh-positive persons (one Hindu, two Europeans and one African) treated in Stanleyville in 1949. Four other Rh-positive subjects gave histories of past attacks of blackwater fever.

He considers that the theory proposed by Butts [this *Bulletin*, 1946, v. 43, 533] to explain the lysis in blackwater cannot therefore be correct, since the presence of an Rh-like factor in malarial plasmodia would produce Rh-antibodies only in Rh-negative subjects.

Blood from the Hindu gave a positive Coombs's test twice during haemoglobinuric periods, and was negative in convalescence.

The author suggests that further study of blackwater fever cases might reveal others with positive Coombs's tests, and so support the idea that some form of immunological mechanism was concerned in the haemolysis of blackwater.

[Foy (*Proc. 4th Internat. Congr. Trop. Med. Malaria*, 1948, v. 1, 793) and Foy and Kondi [*see below*] state : " Coombs's test has been found negative in blackwater fever during the height of the attack, immediately after the attack, and after the lapse of varying periods from the commencement of the attack ".] *B. G. Maegraith*

Foy, H. & Kondi, Athena. **The Correlation between Blackwater Fever, Malaria, Quinine and Atebrin.** *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 309–18, 4 figs. [32 refs.]

There was a very low incidence of blackwater fever in the malaria epidemic in Greece in 1942 ; the decrease in incidence of blackwater fever has since continued. In this paper the authors analyse the reasons for this. They demonstrate from available figures that the number of cases of blackwater in any one year is independent of the amount of malaria in the previous year or two years but is directly related to the " volume of malaria " in the same year. In a previous paper [this *Bulletin*, 1949, v. 46, 316] they suggested that one of the major factors was substitution of atebrin [mepacrine] for quinine ; there is a high correlation between the taking of (the last dose of) quinine and the appearance within 15 hours of haemoglobinuria. In a very interesting discussion the authors point out that although there is this high positive correlation between quinine and blackwater fever, other factors may also be operating. For example, " any drug of use in the treatment of malaria may carry with it the risk of precipitating an attack of blackwater, especially if it is only partly effective and is taken in inadequate doses ". The validity of the high correlation between quinine and blackwater could only be tested by a control experiment ; an approximation to such an experiment was performed in 1942 when atebrin was substituted for quinine during the malaria epidemic. The data quoted show a close correlation between malaria and blackwater when quinine was used, but not when atebrin was substituted, in spite of a great rise in malaria incidence. The authors conclude : " It is our opinion that the substitution of atebrin for quinine was one of the most important factors in the low incidence of blackwater fever that followed the malaria epidemic of 1942. It probably led to great reductions in the incidence of *P. falciparum* infections, which are very prevalent in malaria epidemics in Greece. We are also inclined to believe that it was an important factor in the remarkable fall in malaria incidence in Greece which has taken place during the years following 1942—much more important than the use of DDT, which was not introduced till the latter part of 1945 and 1946, by which time malaria had already fallen to an extremely low level."

The experiences of Fairley in the South-West Pacific [this *Bulletin*, 1945, v. 42, 630] and Findlay [*ibid.*, 349 ; 1950, v. 47, 329] in West Africa support the view that the substitution of atebrin for quinine had a favourable effect on the incidence of blackwater, possibly by controlling *P. falciparum* infection.

Other factors were probably also concerned in reducing the incidence of blackwater after the 1942 epidemic, including " immunity " and the diminished gametocyte reservoirs resulting from the high infant mortality.

There is a brief discussion on the genesis of haemolysis in blackwater fever. The inoculation into neurosyphilitics of blood from 58 active cases led in most

instances to infection with malaria but never to blackwater fever. Coombs's test was consistently negative at all stages of the attack of blackwater, and transfusion of plasma from blackwater cases into normal and malarious subjects did not promote haemoglobinuria [this *Bulletin*, 1945, v. 42, 634]. The authors comment : " These facts, taken together, would seem to weaken the antigen-antibody hypothesis as a factor in the production of the haemolysis of blackwater fever ; but sufficient information is not yet available for the suggestion to be entirely ruled out ". *B. G. Maegraith*

TRYPANOSOMIASIS

i. Brazzaville [A. E. F.] : Rapport sur le Fonctionnement Technique de l'Institut Pasteur en 1948 [Ceccaldi, J., Director]. 50–76. Service de la surveillance de la maladie du sommeil.

ii. —— 1949 [Ceccaldi, J., Director]. 54–84. Surveillance de la maladie du sommeil. [**Sleeping Sickness Control.**]

i. There was no case of sleeping sickness among 1,094 Europeans examined during the year. The progress is recorded of four European patients whose infections were diagnosed in earlier years and whose earlier histories were given in previous reports. Among Africans, 209 infections were seen for the first time ; 155 of these were new cases, 43 were cases first diagnosed and treated elsewhere than at the Brazzaville Pasteur Institute at various times from 1940 to 1947, and 11 were patients suspected of being infected on grounds other than the actual demonstration of trypanosomes. The methods of treatment used and the interim results of treatment are described. No unusual features are apparent.

An account of the 155 new cases seems to have been published elsewhere [Ceccaldi *et al.*, this *Bulletin*, 1950, v. 47, 822]. That all is not yet well with modern methods of treating sleeping sickness is indicated by the fact that treatment failed to check the further development of 36 per cent. of the 109 of these 155 patients who did not disappear during or immediately after treatment. Among 602 old cases who were treated between 1910 and 1947 inclusive the infection was still evident in 18·9 per cent., and a further 3·0 per cent. succumbed.

ii. No new case of sleeping sickness was observed among 1,380 Europeans examined, though further treatment was given to one European patient who had been diagnosed and first treated at Libreville. His case history is given in detail, and to the present reviewer its most striking feature, though this would not be remarkable if it concerned an African patient or if the infection were one of *T. rhodesiense*, is the very short interval between the onset of symptoms (November 1949) and involvement of the cerebrospinal fluid (20 cells and 60 mgm. protein per 100 ml. on December 3rd 1949). Details are also given of the progress of 7 other European patients whose earlier histories had been described in previous reports. These detailed case-reports of infections in Europeans (since their movements and progress can be followed so much more easily than those of Africans) constitute one of the more valuable features of the Reports of the Brazzaville Pasteur Institute : it is to be hoped that the Institute will arrange to continue recording the progress of the patients concerned even after they have permanently left Africa.

Among Africans 170 infections were seen for the first time, of which 123 represented new cases, 29 were cases first treated elsewhere between 1940 and 1948, and 18 were " suspects ". Of the 123 new cases 24, 8 and 66 per cent. were in the lymphatico-blood stage, the stage of meningeal reaction and the

meningo-encephalitic stage, respectively. However, this does not represent the natural incidence of these three phases of the infection, for most of the patients seen were those who presented themselves after their symptoms had become really troublesome. A closer approximation to the true relative incidence is obtained from consideration of only those cases which came to light during systematic surveys of sections of the population ; these cases numbered 44, and the incidence of the three phases of infection in this group were 55, 18 and 27 per cent., respectively.

A great variety of systems of treatment was employed, involving compounds of the Friedheim series (Mel B=Arsobal=3,854 RP, and melarsen oxide= 3,177 RP), pentamidine and lomidine, a substance called "Trépolysine", and tryparsamide. The work is described in close detail at great length, and most of the results are of an interim nature and cannot be readily or usefully summarized further than has already been done in abstracts of other papers which have been published on some of the same clinical material [Pentamidine : Ceccaldi *et al.*, this *Bulletin*, 1950, v. 47, 18. Melarsen oxide : Ceccaldi *et al.*, this *Bulletin*, 1950, v. 47, 528. Mel B : Ceccaldi *et al.*, this *Bulletin*, 1950, v. 47, 824].

Among 500 old cases who were treated between 1910 and 1948 inclusive the infection was still evident in 14·0 per cent., and a further 1·2 per cent. died.

E. M. Lourie

von Brand, T., Tobie, Eleanor J. & Mehlman, B. **The Influence of some Sulfhydryl Inhibitors and of Fluoroacetate on the Oxygen Consumption of some Trypanosomes.** Reprinted from *J. Cellular & Comp. Physiol.* 1950, Apr., v. 35, No. 2, 273–300. [34 refs.]

It has been shown by the work of the present authors and others that different enzyme systems are operative in the various species of trypanosomes. This fact has led them to investigate inhibitors of other systems, particularly those involving sulphydryl groups. The effect of these substances on blood and culture forms of different species of trypanosomes was compared. The preparations of the blood forms were obtained by cardiac puncture of rats followed by defibrination or the use of heparin, and the glucose content was brought up to 0·4 per cent. Warburg flasks of 5 to 6 ml. capacity were used for respiratory measurements in an atmosphere of air with 0·8 ml. of blood to which 0·2 ml. of drug in saline was added to give the desired concentration, and saline alone in the case of controls.

Data on the respiratory activity of the blood forms of trypanosomes of the *lewisi*, *congolense*, *evansi*, and *brucei* groups are given as well as for certain culture forms. The effect of inhibitors on oxygen consumption is given in great detail and cannot be adequately summarized here. Briefly it was noted that the blood forms of the *evansi* and *brucei* groups were very sensitive to a number of sulphydryl inhibitors, while those of the *lewisi* group were less sensitive, and the *congolense* group was intermediate in this respect. Cysteine, glutathione and BAL protected the blood stream forms from inhibition by arsenicals and other sulphydryl inhibitors and could also reverse inhibition. The response of culture forms to inhibitors was not so clear cut.

J. D. Fulton

Burtt, E. & Jackson, C. H. N. **Illustrations of Tsetse Larvae.** *Bull. Entom. Res.* 1951, Feb., v. 41, Pt. 3, 523–7, 12 figs.

As the title implies, the outstanding value of this paper lies in the illustrations, which are briefly discussed in the text. They include figures of the egg, and of all the instars of the larva of *Glossina swynnertoni* with notes on the characteristic points of difference between the instars. The authors also show a series

of six drawings, of the stages in the progression of the third instar larva. They are based partly on observation and partly on a ciné-film and show a cycle of movement occupying altogether about one second. Some difficulty has been found in drawing the segmentation and in interpreting the segments, and on this point, previous authors have not been in agreement. The matter is one which could only be settled by a study of the segmentation of the developing embryo. In the absence of information of that sort one would have no difficulty in accepting the authors' views on the numbering of the segments, which are given in a diagram. *P. A. Buxton*

MONNET, A. Recherche et dosage du 2·224 RP et du 3·854 RP (Melarsen et Mel. B de Friedheim) dans le sang et l'urine. [**Estimation of Melarsen and Mel B in Blood and Urine.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1949, v. 6, No. 2, 173–6.

Melarsen forms a yellow-orange or yellow-gold solution with β-naphthol or "*thiocol*" after diazotization under appropriate conditions. This has been utilized for methods, which are described in detail, of estimating Melarsen in the blood and urine. The figures given for the minimum concentrations detectable are 2·64 mgm. per ml. in whole blood and 10 mgm. per ml. in urine. The methods are therefore inadequate for clinical application.

Diazotization techniques are less sensitive for Mel B than for Melarsen, but Mel B forms a violet solution with furfurol in the presence of sulphuric acid, and this reaction has been utilized for methods, also described in detail, of estimating Mel B in the blood and urine. When added to whole blood in known amount there was 100 per cent. recovery. [It is not quite clear what was the amount added : the resulting concentration is represented as being of clinical interest, and is quoted as "1 mg. 8 de Mel B pour 10 cc. (soit 0 cc. 5 de solution à 3,6%)".] *E. M. Lourie*

PIZZI P., T. Estudios citologicos sobre *Trypanosoma cruzi*. I. Observaciones en medios de cultivo : a) Morfología general ; b) núcleo ; c) condrioma. [**Cytological Studies on *Trypanosoma cruzi*. I. Observations in Culture : (a) Morphology, (b) Nucleus, (c) Chondriome.**] *Biológica.* Santiago. 1948, July–Dec. & 1949, July–Dec., Nos. 8, 9, 10 & 11, 93–104, 8 figs. on 4 pls. [18 refs.] English summary.

This is the first of a series of publications dealing with the cytology of *Trypanosoma cruzi*. In the present paper a description is given of its general morphology, nuclear structure and chondriome, as seen in cultures. Various strains of the trypanosome were isolated from Chilean Triatomid bugs and maintained in culture in Senekjie's and Muñiz-Freitas's media. The study was based on examinations (*a*) of fresh preparations, (*b*) by phase contrast microscopy, (*c*) dark field, (*d*) by fluoroscopy, and (*e*) of material stained by one of the following methods : Giemsa's, Heidenhain's or Regaud's haematoxylin, Janus Green (vital), Feulgen's and Unna's.

In cultures, the flagellates appear mainly in the crithidial stage, in which their reproduction by binary fission takes place. Though trypanosome forms are also present, they are usually scanty, whereas the leishmanial form is assumed mainly when the conditions (*e.g.*, *p*H, temperature) become unfavourable. When seen in haematoxylin-stained preparations, the nucleus has a typical vesicular structure, characterized by a central karyosome and a fine membrane. Feulgen's nuclear reaction shows that during the resting stage thymonucleic acid is arranged on the periphery, but during division the stained substance is scattered in the form of granules or rods, numbering 6 to 10 and

regarded as chromosomes. However, there was no clear evidence of mitosis. Janus green, Regaud's haematoxylin and phase microscopy revealed the presence in the cytoplasm of the flagellates of numerous granules and rodlets representing the chondriome [*i.e.*, the total mitochondrial content of the cell]. It is thought that the high development of the chondriome in this trypanosome is correlated with the importance of ascorbic acid in its metabolism. This is borne out by the fact that vitamin C is not only an essential growth factor of *T. cruzi* in culture, but it is also stored in the chondriome. *C. A. Hoare*

PERRIN, Margarita. Cardiopatia Chagasica experimental con un esquisotripanosoma aislado en Mexico. (*Schizotripanum cruzi* var. *mexicanum.*) [**Experimental Cardiopathy with a Trypanosome Isolated in Mexico** (*Trypanosoma cruzi* **var.** *mexicanum*).] *Medicina.* Mexico. 1951, Feb. 10, v. 31, No. 621, 46–52, 11 figs.

DE LEON, J. R. El *Trypanosoma rangeli* observado en seres humanos en Guatemala. [*Trypanosoma rangeli* **in Human Beings of Guatemala.**] *Publicaciones del Instituto de Investigaciones Cientificas.* Guatemala. 1949, No. 3, 36 pp., 46 figs. & 2 pls.

ii. ——. Un nuevo foco de tripanosomiasis humana por el *Trypanosoma rangeli*, descubierto en Guatemala. [**A New Focus of Human Trypanosomiasis due to** *Trypanosoma rangeli* **in Guatemala.**] *Ibid.* 1950, No. 4, 19 pp., 8 figs.

In these two papers an account is given of human infections with *Trypanosoma rangeli* in Guatemala.

i. The earliest records of the occurrence in the New World of a human trypanosome distinct from *T. cruzi* go back to 1934–35. The parasite was first described by MONTENEGRO in 1943, while the present author named it *T. guatemalense* in 1946. However, PIFANO *et al.* [this *Bulletin*, 1948, v. 45, 1072] later pointed out that it was identical with *T. rangeli* Tejera, 1920, which they isolated from man in Venezuela.

Working in the University of San Carlos, during the last 15 years, the author discovered among young children 17 cases of infection with *T. rangeli*, all of which were diagnosed by direct finding of the parasite in stained thick blood films. Since the infection was very slight (usually one trypanosome per film), many other cases must have been missed; it is therefore thought that the actual incidence of the infection in Guatemala is much higher. The author was unable to find any evidence of clinical symptoms attributable to this form of trypanosomiasis : some of the earlier subjects, when re-examined later, appeared to have reached the adult state without having suffered any discomfort during the intervening period.

A considerable part of this paper is devoted to the structure and bionomics of *T. rangeli*, which were studied in cultures isolated from the human cases and in the vector, *Rhodnius prolixus*, fed on these cases, as well as in blood films from the human host. The blood form is a very slender trypanosome, with a well-developed undulating membrane and a long free flagellum ; the nucleus is in the anterior part of the body, while the small (punctiform) kinetoplast is situated at some distance from the attenuated posterior end of the body. [The appearance of the trypanosomes is illustrated by a number of photomicrographs, but unfortunately these do not convey a clear picture of its morphology.] Reproduction takes place in the peripheral blood by longitudinal binary fission. The development of *T. rangeli* in the Triatomid bug and in culture agrees in general with the account given by PIFANO *et al.*

[*loc. cit.*], but, in addition to the forms described by these authors, de Leon found stages of multiplication which he interprets as schizogony and compares with the "spheres" of *T. lewisi* in the flea gut. [However, from some of his figures it is evident that this is not schizogony but a form of multiple division resembling that of the blood forms of *T. lewisi* ; it is probably the result of repeated binary divisions in which cytoplasmic fission is retarded. Atypical multiple division in the intermediate host has also been observed in other species —*e.g.*, *T. gambiense*—but it is of no significance in the normal life-cycle of the trypanosomes.]

Reproduction by "schizogony" is used by the author as an argument for transferring *T. rangeli* to the genus *Schizotrypanum*. [Here it must be noted that those who recognize the independent status of *Schizotrypanum* do so only on the grounds that its multiplication in the vertebrate host does not take place in the trypanosome stage but only in the leishmanial stage. Since, according to the author himself, the blood forms of *T. rangeli* reproduce by binary fission, its inclusion in the genus *Schizotrypanum* has no justification whatever. (The reviewer has discussed this question fully elsewhere : see this *Bulletin*, 1936, v. 33, 647.)]

The author failed to infect with *T. rangeli* various laboratory rodents, dog, macaque monkey, as well as wild opossums, but he believes that some wild mammal serves as a reservoir host from which Triatomid bugs carry the infection to human beings, especially young children. In some districts of Guatemala, infected *Rhodnius* have been found in dwellings in association with infected children.

ii. In the second paper, the author reports the discovery of a new focus of *T. rangeli* infection in two villages. Blood cultures taken from children up to the age of 4 years revealed three new cases, which with the previous ones, make a total of 20 cases hitherto reported from Guatemala. It is noted that in that country the incidence of *T. rangeli* infection is higher than that of Chagas's disease.

A number of infected children were examined clinically in a hospital, where X-rays revealed in some of them enlargement of the cardiac shadow, which might have been due to trypanosomiasis. *C. A. Hoare*

LEISHMANIASIS

KOENIGSTEIN, R. P., CHIU, Y. S. & TSAI, K. C. **Contribution to the Epidemiology of Kala-Azar in Hangchow and Surroundings.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Dec., v. 44, No. 3, 347–50, 1 map.

The last few years have brought about a great change in the geographical distribution of kala azar in China. Before the Japanese war (1937) only rare indigenous cases of kala azar were found south of the Yangtze river. Since 1947, the number of cases of kala azar seen at the Kwang-Chi Hospital, Hangchow, Chekiang Province, have increased steadily. There were no cases in 1946, 20 in 1947, 25 in 1948 and 49 in 1949. Although many of the patients had never left Chekiang, there was usually a history that some of the relations had migrated from further north, but in October, 1948, a boy was admitted with kala azar whose brother had had the disease two years previously. In his home there was a dog which was emaciated and covered with sores. Leishmaniae were found in the liver, spleen and bone-marrow of the dog.

In Hangchow, one hundred stray dogs were killed and examined ; 59 were found to be infected with *Leishmania*.

The authors attribute the creation of a new endemic focus to the mass migrations and movements of armies that have occurred between 1937 and 1949, from north to south, from old kala azar endemic areas to previously free areas. [It is not clear whether the movements of dogs associated with the movements of the population was the cause of the introduction of the disease, or whether the local dogs became infected from the imported human cases.] *L. E. Napier*

LEWIS, D. J. & KIRK, R. **The Sandflies (Phlebotominae) of the Anglo-Egyptian Sudan.** *Bull. Entom. Res.* 1951, Feb., v. 41, Pt. 3, 563–75, 17 figs. [19 refs.]

The previous list by the same authors [this *Bulletin*, 1948, v. 45, 163] is here modified and extended to 36 species and 8 varieties of Phlebotominae. The classification of *Phlebotomus* into three subgenera [*ibid.*, 1946, v. 43, 796] is retained. A list of recent records, and notes on distribution, are given, accompanied by 16 explanatory sketch maps, showing distribution within the Sudan.

The sandfly fauna of the Sudan is mainly Ethiopian, but has Palaearctic and Oriental affinities. Small areas in the south-west, south-east, and north-east, contain species typical of the West African sub-region, the East and South African sub-region, and the Somali Arid District, respectively. *P. alexandri* is remarked upon as occurring far outside its normal range, in the Kapoeta area of the extreme south, which is more arid than the rest of southern Sudan, and has a northern type of vegetation. There appears to be a sharper demarcation of the Guinean and Sudanese Savanna sandfly faunas than there is of the corresponding mosquito faunas.

An important breeding site for sandflies is provided by the fissures which develop in clay soils exposed alternately to flooding and drought. This is particularly characteristic of the area enclosed by the Atbara river and the White Nile, which area is also an important kala azar region. Bats inhabit these fissures and have been reported [this *Bulletin*, 1943, v. 40, 414] as sandfly hosts. In the northern Sudan, soil fissures are believed to be the main breeding place, since cracks in the walls of houses are usually too dry for the larvae. *P. papatasi* is often more common on the outskirts of a town, where the fissures are not filled by trampling of man and animals.

Notes are given on control of sandflies by DDT and repellents.

A. J. P. Goodchild

UEBEL, H. Über Eiweissstoffwechselstörungen bei infantiler visceraler Leishmaniose unter besonderer Berücksichtigung der pathologischanatomischen Veränderungen. [**Disturbances in Protein Metabolism in Infant Kala Azar and the associated Tissue Changes.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Jan., v. 2, No. 3, 327–37. [Numerous refs.]

Basing his remarks on 13 cases of infant kala azar the author, with many references to the work of others, records the clinical condition, the blood chemistry and disturbances in protein metabolism, and relates these to the changes in the pathological anatomy of the tissues as revealed at autopsy. He found a dysproteinaemia, probably the result of hyperglobulinaemia, of the gamma-plasmocytoma type, with stimulation of the reticulo-endothelial system and degeneration of the liver parenchyma ; in fact, the dysproteinaemia is thought to be due to this. At the same time there were signs of glomerulonephritis. This association of changes in the reticulo-endothelial system, the liver and the kidney may be considered as comparable with the " hepato-renal syndrome of Nonnenbruch ". *H. Harold Scott*

TERRY, L. L., LEWIS, J. L., Jr. & SESSOMS, S. M. **Laboratory Infection with *Leishmania donovani* : a Case Report.** *Amer. J. Trop. Med.* 1950, Sept., v. 30, No. 5, 643–9, 4 figs. [10 refs.]

A laboratory worker who had been bitten on several occasions by leishmania-infected laboratory animals developed a swelling of the left index finger : this involved the two proximal phalanges and made bending at the proximal interphalangeal joint difficult. The finger was slightly tender, it was warmer than the other fingers, and there was a suggestion of cyanosis. After about three months an epitrochlear lymph gland became enlarged (1·5 cm. in diameter) ; this was fixed but not tender. Some smaller axillary glands were also felt. At no time did the patient have any fever or other generalized symptoms, nor were there any physical signs other than those associated with his finger.

There was no response to penicillin. The epitrochlear gland was aspirated and bodies suggestive of leishmania were found in the smears. The gland was later removed ; the identity of the bodies was confirmed by impression smears, histological sections and cultural methods.

" Examination of a section of the lymph node . . . revealed the normal architecture of the node almost completely destroyed. Pericapsular lymphocyte and eosinophile infiltration was present and throughout the section there was a granulomatous process characterized by discrete or conglomerate small nodules or cords of cells with pale or vesicular nuclei and wide cytoplasmic zones, appearing epithelioid in pattern. There were no Langhan's giant cells nor tubercle formation. There was severe swelling of capillary endothelial cells and in some areas haemorrhage and fibrinoid necrosis were noted."

A sternal puncture demonstrated no leishmania.

The patient was given Stibanose, a proprietary pentavalent antimony preparation containing 20 mgm. of antimony per ml., in doses from 10 ml. daily to 20 ml. twice daily up to a total of 310 ml. Within five days the finger decreased in size and within fourteen days of the commencement of treatment it was normal. Three and a half months later there was no evidence of recurrence, but a further course of 390 ml. of Stibanose was given. There was still no evidence of recurrence six months later.

The total amount of antimony given was 14·0 grammes [sufficient to cure fourteen average Indian kala azar patients]. Hyaline casts were noted in the urine during the second course of injections and the electrocardiogram showed lowering of the T-waves.

[The parasite was throughout referred to as *Leishmania donovani* presumably because it was the only species being used in the laboratory, but this latter fact is not specifically stated.] *L. E. Napier*

FEVERS OF THE TYPHUS GROUP

WINKLE, S. Die Bedeutung der Proteus-Antigen-Analyse für die serologische Diagnostik der Rickettsiosen im Zusammenhang mit der Okologie der X-Stämme. [**The Importance of *Proteus* Antigen Analysis in the Serological Diagnosis of Rickettsial Disease in relation to the Ecology of the X Strains.**] *Beiträge z. Hyg. u. Epidemiol.* 1948, No. 4, 47 pp. [Bibliography.]

The author has brought within the compass of this monograph the results of his various investigations on the antigenic structure of the *Proteus* group with particular reference to the diagnosis of rickettsial infections by the use of the Weil-Felix reaction. [These findings have already been published in

virtually identical form as separate papers previously reviewed in this *Bulletin*, 1945, v. 42, 545 ; 1947, v. 44, 573] He includes a section, not covered by the title of the monograph, on the prevention of swarming of *Proteus*, either by the use of a medium containing metachrome yellow, lactose and bromthymol blue (*Zent. f. Bakt.* I. Abt. Orig., 1947, v. 152, 103) or by the addition of a polyvalent *Proteus H* antiserum to agar media. *B. Moore*

MURRAY, E. S. & SNYDER, J. C. **Brill's Disease. II. Etiology.** *Amer. J. Hyg.* 1951, Jan., v. 53, No. 1, 22–32, 1 fig. [29 refs.]

The authors describe an investigation of seven strains of *Rickettsia prowazeki* whose isolation from patients suffering from Brill's disease has already been described by them and seven other collaborators [see this *Bulletin*, 1950, v. 47, 729].

The strains were tested by cross-immunity tests in cotton rats, by virulence and cross-immunity tests in weanling white mice, by complement-fixation tests with sera of inoculated guineapigs and of patients, and by control tests. The technical methods employed are fully described, they were novel in certain respects. The identity of the strains with *R. prowazeki* was demonstrated and so was the existence of definite antigenic differences between them and *R. mooseri*.

The authors do not claim to have fully established Zinsser's hypothesis that Brill's disease is a recrudescence of a former attack of louse-borne typhus ; they state that final proof must await the isolation of the rickettsiae in conditions which preclude any possible environmental sources of infection.

[It seems unlikely that persons coming from typhus-infected countries in Europe should be almost the only persons infected by mysterious local strains of infection, and that if so attacked they should never become sources of infection to contacts.]

In the course of the experiments the authors exclude the possibility that the strains isolated from patients were murine strains which had acquired the characters of *R. prowazeki* by passage through lice ; they found that the strains isolated directly from patients were identical with those obtained from lice. They also quote unpublished experiments in which they have passed a murine strain through five serial passages in human body lice without producing any change in the antigenic properties of the strain, and two other murine strains were also found to remain unchanged after one passage through lice.

[These observations tend to support the view that *R. mooseri* does not undergo transformation into *R. prowazeki* when transmitted by human lice ; they do not, however, prove that such transformation can never occur.]

John W. D. Megaw

SPÄT, W. Ein neuer Weg in der Fleckfieberforschung. Der Erreger auf künstlichen Nährböden reingezüchtet. Das Phänomen der kranken Bakterien. [**A New Method of Research in Typhus Fever.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, Nov. 25, v. 156, No. 3, 171–9. [10 refs.]

The author claims to have cultivated *Rickettsia prowazeki* from cerebrospinal fluid obtained from patients suffering from very severe attacks of typhus fever complicated by meningitis. He added 10 cc. of the fluid to 150 to 200 cc. of Levinthal-bouillon in large flasks and found the rickettsiae fully developed within 24 hours. Doses of 0·1 cc. of the culture caused a febrile response in guineapigs after an incubation period of eight days. In smears made from the cultures the rickettsiae were seen as small rods " very like rickettsiae ".

Further attempts to cultivate rickettsiae in this cell-free medium failed, but the author attributes the failure to the lower virulence of the infection.

Guineapigs inoculated with the positive cultures sometimes died ; their organs were reported to have shown the typical lesions of experimental typhus fever.

The author believes that the invariable failure of all previous attempts to cultivate the rickettsiae in ordinary media have been due to the adverse effect of circulating antibodies on the organisms and he states that it is a case of " sick bacteria ".

Most of the paper consists of a discussion of the theoretical aspect of the subject. Those interested in this must read the original paper.

John W. D. Megaw

FRANK, H. R. Zur Symptomatologie des Fleckfiebers. [**A Note on the Symptomatology of Typhus Fever.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Jan., v. 2, No. 3, 322–6. [13 refs.]

The author describes alopecia of the outer sides of the legs as being common among persons convalescent from typhus fever and as being associated with a trophic neuritis of the musculo-cutaneous nerves. He states that the condition has not previously been described ; it was completely absent in only two out of 32 patients, it was pronounced in 27 cases, and in two cases the affected area looked as if it had been shaved with a razor.

Disturbances of sensation were present in 27 cases ; the most frequent of these was diminished sensitivity, which occurred in 14 cases.

John W. D. Megaw

DAVIS, W. A. **Typhus at Belsen. II. Clinical Course of Epidemic Typhus in Persons who had received Craigie Typhus Vaccine.** *Ann. Intern. Med.* 1951, Feb., v. 34, No. 2, 448–65, 4 figs. [14 refs.]

Craigie vaccine is a modification of the original Cox yolk-sac vaccine ; it was prepared under the supervision of Craigie at Toronto for the British and Canadian armies. It was made from a mixture of two parts of yolk sacs infected with *Rickettsia prowazeki* and one part of yolk sacs infected with *R. mooseri*. Ether was added to the homogenized mixture which was then frozen with CO_2 ice and thawed to break up the protein-lipoid complex. The rest of the process was as outlined by Topping for commercial laboratories in the U.S.A.

Among the 68 British workers exposed to special risk of infection, by medical attendance on louse-infested typhus patients in the Belsen Camp, 12 were attacked despite previous inoculation with three or more doses of the Craigie vaccine, 24 to 100 days previously, and despite precautions which included dusting with DDT. Two other British volunteers were also attacked ; one of these was an Englishwoman aged 56 who had suffered from rheumatic mitral stenosis for 27 years ; she had received two doses of Craigie vaccine three months previously ; fortunately her attack was mild.

The average age of the British patients was 31·8 years.

Among 432 Hungarian soldiers who worked in the camp, 16 were attacked 4 to 16 days after receiving one dose, or the first of two doses, of the vaccine. Their average age was 28·8 years.

There were 41 cases among German nurses and soldiers, none of whom had accepted the offer of vaccination ; 32 of the cases were among 48 nurses who were engaged in washing the sick inmates of the camp. The average age of the German patients was 25·9 years.

The average duration of the fever among the British patients was 8·7 days, it was 13·6 days among the Hungarian patients and 14·9 among the Germans. The only deaths that occurred were two in the German group.

It was concluded that the vaccine, given 24 to 100 days previously, shortened the duration of the illness and lessened its severity ; it seemed possible that the vaccine given to the Hungarian patients during the incubation period had some value.

The attacks among the British patients were classified as : severe, 1 ; moderate, 5 ; mild, 7 ; and very mild, 1.

The complement-fixation titre among British patients, tested between the 13th and 18th days, ranged between 1–160 and 1–2,560 with epidemic-typhus antigen and between 1–80 and 1–640 with murine-typhus antigen ; it was twice to eight times as high with epidemic as with murine antigen. The Weil-Felix titre of sera taken on the same days ranged from 1–80 to 1–1,280.

John W. D. Megaw

DURAND, P. Dix ans de lutte contre le typhus en Tunisie. [**Ten Years of Effort to control Typhus in Tunisia.**] *Ann. Inst. Pasteur.* 1950, Nov., v. 79, No. 5, 579–90.

This paper is of special interest ; it tells how and why killed vaccines prepared from the lungs of infected rodents came to be employed in Tunisia instead of the live vaccines which alone were used up to the end of 1939, and by which more than a million persons had been inoculated. By the end of 1940, experiments with formol-killed vaccines had reached a stage which justified the preparation in 1941 of 123,000 cc. of this vaccine, and in 1942 the amount rose to 334,000 cc.

The only drawback connected with the formolized vaccine was that three doses were needed to give satisfactory protection and it was often difficult to persuade people to attend for the complete course. An attempt was therefore made to devise a one-dose vaccine, and it was found that the addition to the rickettsial suspensions of 2 to 10 parts *per mille* of isoamylxanthate of potassium or sodium killed the organisms within an hour. A single dose of this vaccine, called the xanthate vaccine, gave good protection to guineapigs.

In 1942 a crucial test was carried out to find the relative value of the various vaccines employed in North Africa. Blanc and Laigret collaborated in the conduct of the test, which consisted in the vaccination of groups of persons, numbering 13 to 24, whose blood had been found to contain no typhus antibodies, and afterwards testing the degree of antibody formation in each person by the Giroud intradermal protection test.

The percentages of persons found satisfactorily protected were :—

(1) Durand formolized vaccine, 3 doses, 80 per cent.
(2) Durand xanthate vaccine, 2 doses, 69 per cent.
(3) Durand xanthate vaccine, 3 doses, 95 per cent.
(4) Blanc and Baltazard's live vaccine, 1 dose, 56 per cent.
(5) Laigret's live vaccine, 2 doses, 42 per cent.
(6) Laigret's live vaccine, by scarification, 33 per cent.

Although the superiority of the xanthate vaccine was established it had one drawback ; kept at room temperature its potency fell off after 2 to 3 weeks, whereas the formolized vaccine kept well for about two years, and so it had to be used when circumstances did not permit the early use of the xanthate vaccine.

During the years 1941 to 1949, enough formolized vaccine for the protection of 500,000 persons was prepared, and enough xanthate vaccine for more than 2,000,000 persons was prepared in the same period.

In 1942 a special laboratory was established at the Pasteur Institute of Algeria where millions of doses of formolized vaccine were prepared for Algeria and for the British troops.

Ample evidence is given to show the efficacy of the killed vaccines, and in view of their complete safety it seems likely that they will completely supersede the live vaccines. *John W. D. Megaw*

WORTH, C. B. **House Mice and Commensal Rats in relation to the Dissemination of Rat Fleas.** *Amer. J. Trop. Med.* 1950, Nov., v. 30, No. 6, 917–20.

By experiments described in the paper it was found that the rat-flea, *Xenopsylla cheopis*, is reluctant to infest house-mice even when no alternative host is available. When rats and mice were made equally accessible to the same fleas the rats became infested at least 15 times more heavily than the mice, so it seems likely that mice may be "of little consequence in the spread of arthropod-borne rat disease." *John W. D. Megaw*

GISPEN, R. Het virus van de murine vlektyphus in mijten (*Schöngastia indica*. fam. Trombiculidae). [**The Rickettsia of Murine Typhus in Mites.**] *Med. Maandblad.* Djakarta. 1950, Dec. 1, v. 3, No. 12, 490–95, 1 fig. on pl, [10 refs.] English summary.

Trombiculid mites, *Schöngastia indica*, have been found naturally infected with murine typhus. The mites were taken from house rats (*R. rattus diardi*) and sewer rats (*R. norvegicus*). Emulsions of the mites were given intraperitoneally to mice which died in ten days. Five strains of rickettsia were isolated, four of them from mites collected on uninfected rats; it seems therefore that transovarial infection of mites takes place. In guineapigs the strains had the microscopical characteristics of *R. mooseri*. In complement-fixation tests two of the strains did not prove to be serologically different from Javanese and American strains of murine typhus, but were markedly contrasted to scrub typhus strains from Java.

Schöngastia indica is the commonest Trombiculid parasite of rats in Java. In the central districts 49·7 per cent. of rats had mites of this species, and a mite index of 15·6. Other mites occurred only sporadically. Like other Trombiculids *S. indica* feeds on partly digested skin tissues and not on blood. This suggests some interesting comparisons with other vectors of murine typhus. No experimental transmissions of murine typhus with *S. indica* have been performed, as it has been impossible to culture the mite. However, it seems likely that *S. indica* plays an important rôle in transmission between rats. *J. H. Sudd*

MONTEL, L. R. Fièvre boutonneuse du littoral méditerranéen. Six mois et demi après un typhus murin (suite d'une auto-observation). [**A Case of Boutonneuse Fever in the Mediterranean Coast.**] *Bull. Soc. Path. Exot.* 1950, v. 43, Nos. 11/12, 675–8.

The interest of this case is that the patient, an elderly medical man, had suffered from a stormy attack of murine typhus six and a half months previously [see this *Bulletin*, 1950, v. 47, 974].

The onset of the present attack, which occurred at Saint-Raphael, was very similar to that of the previous illness; the patient's serum was found to agglutinate *Rickettsia conori* at a titre of 1–160. *Rickettsia mooseri* was not agglutinated.

Chloromycetin was given for six days, starting on the 3rd day, in daily doses of 3 gm. for 2 days and then 1·5 gm. daily, to a total of 9 gm. This treatment promptly controlled the fever and it was not followed by the signs of riboflavin deficiency which occurred after the administration of 3·75 gm. aureomycin followed by about 25 gm. chloromycetin over a period of about 12 days in the previous illness. *John W. D. Megaw*

Le Gac, P. & Rouby, M. L'auréomycine dans le traitement de la fièvre boutonneuse en Afrique Equatoriale. [**Aureomycin in the Treatment of Boutonneuse Fever in Equatorial Africa.**] *Bull. Soc. Path. Exot.* 1950, v. 43, Nos. 11/12, 678–81, 1 fig.

In two cases of boutonneuse fever in Oubangui-Chari aureomycin was strikingly effective. The dosage was 0·25 gm. every four hours ; the total quantities given were 3·0 and 4·0 gm.

The authors regard these results as confirmation of the view that the tick-borne fever in Equatorial Africa is the same as boutonneuse fever. They state the fevers called tick-bite fever, tick fever, tick-borne typhus and tick typhus of Kenya can now be definitely regarded as boutonneuse fever.

John W. D. Megaw

Parker, R. T., Bauer, R. E., Lister, L. M., Woodward, T. E. & Hall, H. E. **Further Experience in the Treatment of Rocky Mountain Spotted Fever with Chloramphenicol.** *Amer. J. Med.* 1950, Sept., v. 9, No. 3, 308–14, 4 figs. [10 refs.]

Chloramphenicol (chloromycetin) was given in widely varying doses to 16 patients suffering from Rocky Mountain spotted fever. In 10 out of 14 cases attempts to isolate rickettsiae were successful and in all but two of the cases the Weil-Felix reaction (*Proteus OX19*) was positive at titres ranging from 1–160 to 1–1,280.

Nausea and vomiting never occurred, but two patients who received large doses (43·25 and 20·75 gm.) developed glossitis [presumably due to riboflavin deficiency resulting from the action of the drug on the intestinal flora].

The clinical response was prompt and satisfactory except in one case in which there was pyogenic osteomyelitis. The average duration of the fever after the first dose was 4·4 days ; this was exceptionally long, probably because of the severity of the illness which in the previous years had a case fatality rate of 23·5 per cent. in the same hospital. No death occurred among the treated patients of the present series. *John W. D. Megaw*

Pascale, H. Rickettsioses em São Paulo. Contribuição ao estudo da epidemiologia da febre maculosa e do tifo murino. [**Rickettsial Diseases in São Paulo. An Epidemiological Study of Spotted Fever [Tick-borne Typhus] and Murine Typhus.**] *Arquivos de Hig. e Saúde Pública.* S. Paulo. 1949, v. 14, Nos. 39, 40, 41 & 42, 5–52, 7 folding maps & 17 graphs. [34 refs.] English summary.

This paper is a monograph on the epidemiology of the deadly form of tick-borne typhus which was first identified in the state of São Paulo by J. T. Piza *et al.* who called it " the exanthematic typhus of São Paulo."

The lethality rate is still reported to be remarkably high, ranging between 70 and 90 per cent. despite the fact that most of the patients were under 25 years of age.

Murine typhus is now known to be widely distributed in São Paulo.

The large amount of information contained in the paper is of special interest to workers in Brazil but it has an important bearing on the subject of the tick-borne and flea-borne typhus fevers. Louse-borne typhus does not appear to have been reported from São Paulo in recent years.

The great efforts to control the tick-borne disease deserve high praise, but there seems to be little hope of success from measures directed against the tick vectors and the animal reservoirs of infection. *John W. D. Megaw*

DE MAGALHÃES, O. & ROCHA, A. Subsídio para o conhecimento e diagnóstico das doenças do grupo tifo exantemático no Brasil. [**A Contribution to the Knowledge and Diagnosis of the Diseases of the Exanthematic-Typhus Group in Brazil.**] *Mem. Inst. Oswaldo Cruz.* 1950, v. 48, 151–73, 1 chart. English version 175–97.

The authors describe in detail the results of an extensive study of the serological features of the fevers of the typhus group in Brazil. Their work has thrown light on the problem of the typhus fevers and specially of the tick-borne typhus of Brazil which formerly was regarded as occurring only as a highly virulent disease, whereas it is now known to occur also in a mild form.

A detailed summary is given of the Weil-Felix and complement-fixation reactions observed in cases of typhus-group fevers in man and experimental animals and also in apparently healthy persons and animals living in association with infected human beings.

The merits and limitations of the two reactions are discussed and the conclusion is reached that both ought to be carried out in each case.

In the Weil-Felix test the authors have employed both the O and the H strains of *Proteus X19*, *Proteus X2*, *Proteus XL*, and *Proteus XK*. From the Table it appears that if the three *OX* strains commonly used are alone considered the serological types observed in cases of tick-borne typhus are : (1) The *OX19* type in 7 cases ; (2) the negative type, with no titre in excess of 1–40, in 5 ; (3) the mixed *OX19* and *OXK* type in 3 ; (4) the mixed *OX19* and *OX2* type in one ; (5) the mixed *OX19*, *OX2* and *OXK* type in one ; (6) the *OX2* type in one ; and (7) the *OXK* type in one case.

The authors mention that in a large series of Weil-Felix tests positive reactions (1–640 and 1–320) with *P. OXK* were relatively common ; with *P. OXI9* high titre reactions of 1–1,280 to 1–5,120 were common, and with *P. OX2* these high titre reactions were relatively common.

John W. D. Megaw

DE MAGALHÃES, O., FREIRE, S. A. & ROCHA, A. Ensaios de terapêutica no Tifo exantemático neotrópico no Brasil. [**Experiments in the Therapy of Neotropical Typhus of Brazil.**] *Mem. Inst. Oswaldo Cruz.* 1950, v. 48, 545–97, 1 graph & 3 figs. [Numerous refs.] English summary.

Fuller details are given of the experiments already described in a preliminary note by the authors [see this *Bulletin*, 1950, v. 47, 839].

HERZBERG, K. Epidemiologie der Virusgrippe und der Viruspneumonie (Q-Fieber). [**Epidemiology of Virus Influenza and Virus Pneumonia (Q Fever).**] *Zent. f. Bakt.* I. Abt. Orig. 1950, May 25, v. 155, Nos. 5/7, Bericht pp. 177*–96*. [Numerous refs.]

This paper consists of a comprehensive review of the literature of influenza and Q fever up to the end of 1949, and as such it does not lend itself to the preparation of a summary. The choice of the name " virus pneumonia " as a

synonym of Q fever is unhappy ; the author's attempt to justify its use is half-hearted, and throughout the paper he always refers to the disease as Q fever.

John W. D. Megaw

HARVEY, M. S. **An Outbreak of "Q" Fever in Canterbury.** *J. Roy. San. Inst.* 1951, Mar., v. 71, No. 2, 103–6.

This is described by the author as a descriptive sketch of an outbreak of Q fever in which 27 out of the 204 students and staff of a college in Canterbury were attacked within a period of nine days during a spell of very warm sunny weather.

The students came from all parts of Kent. When one of them was reported as having been admitted to an infectious diseases hospital the deputy principal of the college was struck by the fact that several of the other students were absent, complaining of feverish headaches. He brought the matter to the attention of the author who is Medical Officer of Health of Canterbury. The health officers of the home districts of all the absentees were asked to investigate the reasons for the absence of the students, and within two days information was received that 19 were ill with fever and headache though only two were in hospital.

Four local patients were investigated and a report was received that they had "a rising titre to Q fever in the serological tests", which were carried out about three weeks after the onset of the first case.

Arrangements were made for an investigation of the outbreak by the Public Health Laboratory Service and a report will doubtless be published in due course.

The epidemiological feature common to all the cases was attendance at the college in Canterbury.

John W. D. Megaw

MARMION, B. P. **"Q" Fever.** *J. Roy. San. Inst.* 1951, Mar., v. 71, No. 2, 97–102, 1 fig. [12 refs.]

SLAVIN, G. **"Q" Fever.** *Ibid.* 102–3.

A general account.

BURGDORFER, W., GEIGY, R., GSELL, O. & WIESMANN, E. Parasitologische und klinische Beobachtungen an Q-Fieber-Fällen in der Schweiz. [**Parasitological and Clinical Studies of Q Fever in Switzerland.**] *Schweiz. med. Woch.* 1951, Feb. 17, v. 81, No. 7, 162–6, 5 figs. [14 refs.]

The authors describe a combined study of the clinical, bacteriological and epidemiological features of a small outbreak of Q fever which occurred in March and April 1949 in a hamlet, Hunzikon, in East Switzerland. Three persons were attacked ; all of them had been in close contact with a small herd of cows and calves. Three out of 16 cows gave positive complement-fixation reactions with Q fever antigen, and *Rickettsia burneti* was isolated from the urine of one of the reactors. Full clinical features of two of the cases are described ; both patients were treated with aureomycin in doses of 2·0 gm. daily for three and six days respectively, with strikingly satisfactory results.

In one case the complement fixation test was negative on the 9th day, and positive (1–320) on the 16th day. Rickettsiae were isolated from ticks (*Ornithodorus moubata*) which were allowed to feed on the patient on the 9th day, though his temperature had fallen to normal after aureomycin treatment.

In the other case the fixation test was negative on the 10th and 18th days but was positive (1–320) on the 29th day.

In the third patient referred to the complement fixation test was negative in the 12th day and positive (1–320) on the 19th.

The isolation of rickettsiae from ticks was successfully carried out on a cow and on infected guineapigs ; rickettsiae were found in smears of the intestines of the ticks a few days after feeding on the infected hosts, and they were still found 18 months later.

A thorough search was made for arthropods on the cattle, hens and cats of the farmyard and also in the cattle stalls, hayloft, etc., but no evidence of infection could be found in any of the 20 species of arthropods collected. Only one kind of tick was found, *Ixodes ricinus* from a cat, but this also was uninfected.

The source of infection among the cattle could not be discovered ; meal from South America, used as cattle feed was suspected, but there was no evidence to support this suspicion. *John W. D. Megaw*

Penati, F. & Randone, G. Un caso di febbre Q a Torino. [**A Case of Q Fever in Turin.**] *Giorn. d. Accad. Med. di Torino.* 1950, Jan.–June, v. 113, Nos. 1/6, 24–6.

A clinically typical case of Q fever in Turin was confirmed by a complement-fixation reaction at a titre of 1–1024 on the 17th day of the illness.

The authors mention seven other reports of the occurrence of the disease in various parts of Italy.

In the present case there was no evidence of the source of infection.

John W. D. Megaw

Jadin, J. & Giroud, P. La fièvre Q au Ruanda-Urundi. [**Q Fever in Ruanda-Urundi.**] *Bull. Soc. Path. Exot.* 1950, v. 43, Nos. 11/12, 667–72.

The authors have confirmed the occurrence of two outbreaks of a virulent form of Q fever in Ruanda-Urundi, in the Belgian Congo.

The chief methods of diagnosis were the complement-fixation and rickettsia-agglutination tests.

In one outbreak 450 cases, with 40 deaths, occurred among a population of 6,000 persons. Simultaneous tests with antigens of louse-borne, flea-borne and tick-borne typhus showed that isolated cases of these diseases were occurring.

In the other outbreak 14 out of 32 patients gave positive reactions with the rickettsia-agglutination test for Q fever and 9 with the test for louse-borne typhus.

Ticks (*Ornithodorus moubata*) fed on experimentally infected guineapigs were found to harbour Q fever infection up to at least 4 months after feeding. The altitude of the affected area was 1,700 to 1,800 metres. *John W. D. Megaw*

Vose, F. P. **Q Fever. Report of a Case in Massachusetts.** *New England J. of Med.* 1951, Feb. 22, v. 244, No. 8, 288–9, 1 fig.

" A case of Q fever proved by serological examination is described.

" The possibility that this fever may be an occupational hazard of wool handlers is presented."

Lennette, E. H. & Clark, W. H. **Observations on the Epidemiology of Q Fever in Northern California.** *J. Amer. Med. Ass.* 1951, Feb. 3, v. 145, No. 5, 306–9. [Refs. in footnotes.]

In North California Q fever occurs most frequently among persons associated with sheep or goats ; only one outbreak was clearly due to contact with cattle.

An interesting outbreak is described in which 39 men and 2 women were attacked within a period of 11 weeks in a rural town of 3,000 inhabitants ; only 4 of the patients had been in direct contact with live-stock, and there was no evidence of transmission from person to person. In the grazing areas round the town there were 20,000 sheep among which the infection rate was estimated to be 10·5 per cent. No infection was detected among the few small herds of cattle in the area.

The cases occurred during the season of lambing and shearing ; airborne infection in the form of dust seemed to be a possibility, but the sex distribution of the cases could not be explained.

For North California as a whole about 70 per cent. of the cases could be explained as being due to direct association with sheep, goats and cattle. Milk and arthropods did not appear to play important parts in transmission.

John W. D. Megaw

GIROUD, P. & JADIN, J. Essais d'isolement de souches de fièvre Q au Ruanda-Urundi du lait de vache, du cerveau de chèvres et de tiques d'animaux domestiques et sauvages. [**The Isolation of Strains of *Rickettsia burneti* at Ruanda-Urundi, from Cows' Milk, from the Brains of Goats and from Ticks of Domestic and Wild Animals.**] *Bull. Soc. Path. Exot.* 1950, v. 43, Nos. 11/12, 672–3.

Strains of *Rickettsia burneti* were isolated, by intraperitoneal inoculation of guineapigs, from the milk of cows, from the brain and spleen suspensions of goats living in close association with human beings, and from ticks (*Haemaphysalis leachi*) collected in areas of human infection with Q fever and also in uninfected areas. The ticks were obtained from dogs and cattle.

John W. D. Megaw

RECZKO, Eva. Ueber Ausscheidung und Verweildauer des Q-Fieber-Erregers bei experimentell infizierten Meerschweinchen. [**A Note on the Isolation of Q-Fever Rickettsiae by Guineapig Inoculation and on the Duration of Survival of Rickettsiae in Guineapigs.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, Oct. 16, v. 156, No. 2, 81–4. [28 refs.]

The rickettsiae of Q fever when inoculated intraperitoneally or intratesticularly into guineapigs are most abundant between six and nine days after the onset of the febrile reaction.

Fully virulent rickettsiae have been isolated from a guineapig inoculated with *Rickettsia burneti* 526 days previously. *John W. D. Megaw*

HERZBERG, K., HERZBERG-KREMMER, H. & URBACH, H. Weitere Befunde zur Morphologie und Diagnostik des Q-Fieber-Erregers. IV. Mitteilung. [**Further Findings on the Morphology and Identification of Q Fever Rickettsiae.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, Aug. 15, v. 156, No. 1, 14–22, 1 text fig. & 1 pl. [18 refs.]

The authors give a description, illustrated with excellent photomicrographs, of the various stages of development of *Rickettsia burneti* in the testicles of guineapigs inoculated by the intratesticular route with material containing the rickettsiae.

Three cases are described in which the isolation and identification of *R. burneti* was facilitated by inoculating into the testicles of guineapigs either the heart blood or organ suspensions of guineapigs that had been inoculated with the blood of patients. Rickettsiae can sometimes be demonstrated in smears

before the complement-fixation test becomes positive and there have been cases in which the method has supplied the diagnosis although the fixation test remained negative. The employment of both these methods is recommended. *John W. D. Megaw*

Ransom, Sara E. & Huebner, R. J. **Studies on the Resistance of** *Coxiella burneti* **to Physical and Chemical Agents.** *Amer. J. Hyg.* 1951, Jan., v. 53, No. 1, 110–19. [26 refs.]

The authors have found that yolk-sac suspensions of *Coxiella* [*Rickettsia*] *burneti* survive temperatures of 63°C. for 30 to 40 minutes, whereas suspensions of *Rickettsia mooseri*, *R. rickettsi*, and *R. akari* were killed by a temperature of 50°C. within 15 minutes.

Concentrations of 0·5 per cent. formalin failed to kill *C. burneti* in 96 hours, and concentrations of 1·0 per cent. failed to kill the organism in 24 hours, but were lethal in 72 hours. The other rickettsiae were killed by 0·1 per cent. formalin in 24 hours.

C. burneti resisted the action of 1·0 per cent. phenol for 24 hours whereas *R. mooseri* was killed by 0·5 per cent. in 24 hours.

C. burneti did not differ from the other rickettsiae in its resistance to the effects of ether, ultraviolet rays, penicillin and sulphadiazine.

The viability of the suspensions was tested by passage through yolk sacs, repeated if necessary. When rickettsiae were found in smears of yolk-sac. material survival was checked by inoculation of guineapigs.

John W. D. Megaw

Giroud, P. & Jadin, J. Le pou dans la fièvre Q au Ruanda-Urundi (Congo Belge). Conservation naturelle de l'antigène de la fièvre Q sur le pou. [**The Louse in Q Fever of Ruanda-Urundi (Belgian Congo). Persistence of the Antigen of Q Fever in the Louse.**] *Bull. Soc. Path. Exot.* 1950, v. 43, Nos. 11/12, 674–5.

The people of Ruanda-Urundi are heavily infested with human body lice. In an area in which an epidemic of Q fever had occurred three to four months previously large numbers of human lice were collected and inoculated into guineapigs ; after three passages some of the guineapigs reacted at titres of 1–160 to 1–640 with complement-fixation and rickettsia-agglutination tests for Q fever. The reactions were positive 25 days after inoculation but were still negative 20 days after inoculation.

Lice from an area in which Q fever had not been known to occur were found free from infection. *John W. D. Megaw*

Huebner, R. J. & Bell, J. A. **Q Fever Studies in Southern California. Summary of Current Results and a Discussion of possible Control Measures.** *J. Amer. Med. Ass.* 1951, Feb. 3, v. 145, No. 5, 301–5, 4 charts. [Refs. in footnotes.]

The authors have prepared a useful summary of the extensive studies of Q fever carried out in the Los Angeles area of South California since 1947. They also discuss the possibility of controlling the disease by measures based on existing knowledge of the behaviour of the disease in the area. They expect that pasteurization of the milk supplies will cause some reduction in the incidence of infection and that persons exposed to special occupational risks may be protected by vaccination, but they do not believe that effective control will be possible till satisfactory methods of eliminating the disease among cattle

have been devised and applied. A determined effort is regarded as being necessary in view of the evidence pointing to a progressive increase in the prevalence of the disease. *John W. D. Megaw*

LUOTO, L., HUEBNER, R. J. & STOENNER, H. G. **Q Fever Studies in Southern California. XII. Aureomycin Treatment of Dairy Cattle naturally infected with** *Coxiella burnetii*. *Pub. Health Rep.* Wash. 1951, Feb. 16, v. 66, No. 7, 199–204. [15 refs.]

Ten cows whose milk contained *Coxiella* [*Rickettsia*] *burneti* were treated by intramammary infusions of 100 mgm. of aureomycin twice daily for five days, without effect.

Ten other cows whose milk was infected were treated by daily intravenous injections of 3·0 gm. of aureomycin for five days ; the milk of 9 of the cows was still infected three days later, and five out of seven cows tested six months later were still yielding infected milk. *John W. D. Megaw*

AUDY, J. R. & HARRISON, J. L. **A Review of Investigations on Mite Typhus in Burma and Malaya, 1945–1950.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Feb., v. 44, No. 4, 371–95, 2 figs. [43 refs.] Discussion 395–404 [TAYLOR, J. (Chairman) ; THOMPSON, T. ; KRISHNAN, K. V. ; BERTRAM, D. S. ; FAIRLEY, N. H. ; FELIX, A. ; AUDY (in reply)].

This paper is a lucid and readable general review of the epidemiological work of two British research units working at Imphal from 1945 to 1946, and at Kuala Lumpur from 1947 to 1950. Most of the work of the units has been published and has been reviewed in this *Bulletin*, but the present summary will be very welcome to all who are interested in the subject.

The authors state that the " correct official " name of the disease is mite typhus and that *Rickettsia tsutsugamushi* is the correct name of the causal agent.

The only mites known to be vectors of the disease are the two closely related species of trombiculids, *Trombicula akamushi* (=*fletcheri*) and *T. deliensis* (=*walchi*).

The barriers limiting the extension of the disease are shown in a useful map which also shows the geographical distribution of the species of rats belonging to the genus *Rattus*, which are the chief vertebrate reservoirs of infection.

The types of terrain invaded by the vector-infested rodents are described ; they are chiefly waste lands and abandoned plantations, grassy banks of streams, moist meadows and forest fringes.

An interesting discussion followed the reading of the paper. In replying to the questions asked by the speakers the senior author mentioned the loss of infection that was sometimes observed to occur among mites after transovarial transmission of infection through several generations ; he also discussed the possible causes of the great variations occurring in the virulence of infection. *John W. D. Megaw*

PIKE, G., COHEN, S. & MURRAY, E. S. **Rickettsialpox. Report of a Serologically Proved Case occurring in a Resident of Boston.** *New England J. of Med.* 1950, Dec. 7, v. 243, No. 23, 913–15. [11 refs.]

The authors describe the first case of rickettsialpox that has been reported from any place outside the New York City area where several hundred cases are known to have occurred since 1946. In that year, HUEBNER *et al.* found the disease to be caused by a rickettsia named by them *Rickettsia akari* and

to be transmitted to man from house mice by a mite, *Allodermanyssus sanguineus* [see this *Bulletin*, 1947, v. 44, 411, 707, 897 and 990]. The disease had been described earlier in 1946 by SUSSMAN under the name Kew Gardens spotted fever.

The present case occurred in Boston, Massachusetts, in January 1950. The clinical features and serological findings corresponded with those already described in cases of rickettsialpox. The complement-fixation reactions with antigens of rickettsialpox and Rocky Mountain spotted fever became positive by the 13th day at the same high titre, 1–2,560. In Weil-Felix tests on the 9th, 13th, and 91st days the only positive results obtained were a titre of 1–10 with *Proteus OX19* and *Pr. OX2* on the 13th day ; with *Pr. OXK* the results were always negative.

Attempts to isolate rickettsiae from blood taken on the 8th day were unsuccessful, but in a footnote it is stated that *Rickettsia akari* was isolated from mice trapped in the patient's place of employment.

[It seems to be agreed that the complement-fixation test fails to reveal any significant difference between the antigenic structures of *R. akari* and *R. rickettsi* whereas in most cases the non-specific Weil-Felix reaction shows a significant rise in the *Proteus*-agglutinating antibodies in infections caused by *R. rickettsi*, and little or none in infections due to *R. akari*.]

John W. D. Megaw

ROSE, H. M., KNEELAND, Y., Jr. & GIBSON, C. D. **Treatment of Rickettsialpox with Aureomycin.** *Amer. J. Med.* 1950, Sept., v. 9, No. 3, 300–307, 8 figs. [22 refs.]

Aureomycin in doses of 2·0 to 4·0 gm. daily was strikingly successful in the treatment of eight proved cases of rickettsialpox

There was occasional nausea and vomiting ; in one case treatment had to be suspended because of these side-effects. In three of the cases treatment started on the 1st or 2nd day prevented the development of complement-fixing antibodies, though rickettsiae were isolated from each patient. In one case no rash appeared though there was a typical initial lesion. [No mention is made of the occurrence of relapses such as might be expected in view of what happens among cases of scrub typhus treated early with chloromycetin.]

John W. D. Megaw

YELLOW FEVER

LEVI-CASTILLO, R. Die Epidemiologie des Buschgelbfiebers in Südamerika. [**The Epidemiology of Jungle Yellow Fever in South America.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Jan., v. 2, No. 3, 315–22, 1 map.

A general account.

HUGHES, T. P. & PERLOWAGORA, Alina. **The Application of Immunological Tests of Sera from Captured Wild Animals to the Study of Yellow Fever Epidemiology.** *Amer. J. Trop. Med.* 1950, Nov., v. 30, No. 6, 835–53, 2 charts. [13 refs.]

The attempt to define the sylvan vertebrates which act as reservoirs of jungle yellow fever virus is often undertaken without any proper appreciation of the many assumptions involved in most of the surveys. These surveys, based on the immunological examination of sera from captured wild animals

are valid only when it is well established both that animals of the species under consideration are capable of forming specific antibodies following bites of infected insect vectors, and also that the antibodies formed persist.

This important paper provides this information for a number of common forest animals in those parts of Brazil where yellow fever infection has occurred. The animals were wild ones which were trapped, and proved to be free of neutralizing antibodies for yellow fever virus. The virus was then introduced by subjecting them to the bites of infected *Aëdes aegypti*. Tests were made to determine the presence and persistence of a viraemia, and later, specific neutralizing antibodies were measured. If these were present, complement fixing antibodies were also estimated in some cases.

In 3 species no viraemia could be detected and no neutralizing antibodies developed. In 3 other species a viraemia sometimes occurred and neutralizing antibodies occasionally developed but were transient : in the case of one of these species, the spiny rat, complement fixing antibodies were a better proof of infection.

A brown opossum, on the other hand, had an abundant viraemia, transient neutralizing antibodies, but no complement fixing antibodies.

The extreme diversity of the results in different species illustrates the risk of drawing any deductions when such detailed information is not available.

Forrest Fulton

PLAGUE

Gross, B. & Bonnet, D. D. **Plague in the Territory of Hawaii. I. Present Status of Plague Infection, Island of Hawaii.** *Pub. Health Rep.* Wash. 1951, Feb. 16, v. 66, No. 7, 209–14, 2 figs.

Plague first appeared in the Island of Hawaii in February, 1900, in the shipping centre of Hilo where 25 cases occurred up to March, 1910, when the disease disappeared " spontaneously ", though rat infection was detected up to February, 1912. In neighbouring villages 18 cases occurred between 1905 and 1918, but despite constant surveillance no cases in human beings or rats have been detected since that time in the area.

In 1910 the disease was detected in the Hamakua district [apparently at distances of 30 to 50 miles from Hilo] and since that time the disease has persisted in this district, though in two periods of four years no human cases occurred ; the last of these periods ended in November, 1949, when one case occurred. Infection in rats has been detected every year in the district except for a 12-month period ending in February, 1949, when three flea pools were found infected, and in the rest of the year 16 further rodent infections were detected. Since 1918 this was the only district of the Island in which either human or rodent plague has been detected. Since 1910 the total number of human infections in the district has been 112 and the rodent infections detected were 1,145.

John W. D. Megaw

Link, V. B. **Plague in North America.** *Bol. Oficina Sanitaria Panamericana.* 1951, Jan., v. 30, No. 1, 26–8.

Four cases of human plague, one of which was fatal, have occurred in New Mexico " since July, 1949 ". In each case there had been contact with wild rodents.

The author briefly reviews the history of plague in North America from the first introduction of infection by sea in 1899–1900. There have been altogether more than 500 cases in the U.S.A. ; nearly 900 in Mexico, and one probable case in Canada.

The disease is now firmly established among ground squirrels and other wild rodents in 15 western States of the U.S.A., in spite of large-scale operations in which millions of squirrels were destroyed.

During the past 25 years there have been 25 human cases in six of the western States ; all the cases were sporadic and widely separated ; no secondary infections occurred.

The preventive measures now employed in the U.S.A. are : (1) Surveys to locate foci among wild rodents, (2) Control of domestic rodents near these foci, (3) Early treatment of human cases with streptomycin and sulphadiazine to prevent the development of pneumonic plague, of which there was one outbreak in 1919. *John W. D. Megaw*

ROMER, J. D. **Survey of Fleas from 'Domestic' Rats in the Colony of Hong Kong.** *J. Trop. Med. & Hyg.* 1951, Feb., v. 54, No. 2, 33–6.

This paper summarizes the results of the daily routine examinations of rats by the Rodent Control Section of the Hong Kong Sanitary Department, for the year 1949. Full data are given ; Hong Kong island and Kowloon are treated separately, and monthly totals are given of rat numbers and counts of *Xenopsylla cheopis*, *Leptopsylla segnis*, and *Ctenocephalides* spp., for both *Rattus norvegicus* and *Rattus rattus* (including subspecies *flavipectus* and *sladeni*). The *X. cheopis* index is calculated in every case.

Wire box-type traps were set at widely different points, and inspected every morning. The practice of enclosing traps in cloth bags after collection was not resorted to, but only those rats were examined which were alive when received.

Both in Hong Kong and Kowloon the *X. cheopis* index has a minimum of 0·6–0·9 in July to September and a maximum of 3·4–5·7 in March and April, but it is not clear whether this is connected with the monthly figures for mean temperature, mean relative humidity and total rainfall, which are given. *A. J. P. Goodchild*

CHOLERA

WORLD HEALTH ORGANIZATION. TECHNICAL REPORT SER. NO. 18. **Joint OIHP/WHO Study-Group on Cholera. Report on the Third Session. New Delhi, 18–19 November 1949.** 22 pp. Geneva. 1950, Dec. [1*s.* 3*d.* ; $0.15.]

The Joint OIHP/WHO Study-Group on Cholera visited India in 1949 to examine the various aspects of the cholera problem, to see the work in progress and to advise on further investigations. The group considered (*a*) quarantine aspects of the cholera problem and other items referred to it by the WHO Expert Committee on International Epidemiology and Quarantine, (*b*) laboratory aspects of cholera, (*c*) endemicity, and (*d*) the WHO cholera-control programme for 1950.

Quarantine and other items.—Further studies were recommended on (1) the persistence of cholera vibrios in convalescents and contacts, (2) the viability of the vibrio on, and in, fruits, food and flies, (3) the influence of sulphonamides on vibrio excretion by contacts and carriers. The project

was noted for undertaking an investigation in an endemic area in Southern India on the possibility of subclinical and inapparent cases of cholera constituting a link between epidemics. The study group visited the selected area where investigations on all relevant human and environmental factors would be carried out over a period of at least two cholera seasons. Results had not yet become available.

A method for laboratory diagnosis of cholera put forward in a note prepared by AHUJA, KRISHNAN, PANDIT and VENKATRAMAN was recommended by the study group for adoption as a standard procedure. The note is reproduced in Annex I to the Report, along with appendices giving the particulars of a preserving medium for the transmission of specimens for culture and the composition of selective media for plating and enrichment. [This should be seen by all who may have to undertake the cultural diagnosis of cholera. The procedure is based on the long practical experience of the authors of the note and can be fully recommended.]

A report by KRISHNAN and DUTTA on the results of a study of the agglutination response following anti-cholera inoculation, which is given in Annex 2 to the Report, was considered to indicate the value of such studies in relation to retrospective diagnosis of cholera and as a measure of the immunity of the population in an endemic area. Extension of the investigations on a large scale in non-endemic areas was recommended. Agglutinins had been found to be absent from the sera of the great majority of normal persons and at a low level in the remainder. After inoculation a majority showed titres up to 1/80 but seldom higher. After re-inoculation the titre in about half the cases rose to 1/320. Higher levels tended to be shown by cholera convalescents. With the mixed Inaba and Ogawa vaccine used, an equal titre was obtained against both types of strain. The sera of cases diagnosed bacteriologically as due to infection with the Inaba form gave about the same titres against both the Inaba and the Ogawa strain.

Anti-cholera inoculation.—The study group recorded the following opinion : " The study-group reiterates the opinion expressed during its first session that inoculation is of value and must be taken into account in applying quarantine measures. For this purpose, it advises two injections at a week's interval. Booster doses, if required within six months, may consist of one injection, beyond which period two injections will be necessary. The vaccine must conform to the standard laid down by WHO."

The study group took the opportunity to draw attention of the Expert Committee on International Epidemiology and Quarantine to the opinion which they had previously expressed that " in view of the relative character of the immunity conferred by vaccination, vaccinated persons should not be exempt from all measures of control by the international quarantine regulations. Sanitary ' surveillance ' now provided in the international sanitary convention is, however, considered to be an adequate protective measure."

Laboratory studies.—The group considered the observations which had been made by Dr. Bruce WHITE on the S/R variation of *V. cholerae*, and a note on R to S variation in the presence of anti-phage serum, presented by DOORENBOS and COSSERY Bey, and recommended further work on the subject. Other laboratory studies noted were those on a polysaccharide fraction of *V. cholerae* and on toxic cholera filtrates.

Endemicity.—Statistical studies presented on the incidence of cholera in India were taken to indicate that, in addition to East and West Bengal, other deltaic areas, such as the Cauvery Delta in the Madras Province and the Mahanadi Delta in Orissa are also endemic areas. It is suggested that China may not be a true endemic area. The status of the southern delta of Indochina is under study. The following factors were considered to favour the endemicity

of cholera : (1) Deltaic conditions ; (2) high density of population ; (3) high humidity ; (4) abundance of an uncontrolled water supply ; (5) salinity and high organic content of water ; but cholera may not be endemic in certain regions where many of these conditions exist although these areas may be subject to periodic epidemics. Comparative investigations in similar deltaic regions outside India were recommended. No correlation appeared to exist between the localization of fairs and endemicity of cholera.

Cholera-control programme for 1950.—Recommendations were made on the programme for dealing with endemic areas with the object of eventual eradication of cholera. The formation of a field team was advised for the deltaic area in Madras in which investigations are in progress and a second team for the East Bengal province of Pakistan. The following points were emphasized as of importance as control measures : (1) Provision of pure water in abundant quantities in order to obviate the necessity of using uncontrolled water ; (2) development of suitable and economical methods of disposal of excreta with reference to family dwellings ; (3) health education of the affected population to ensure co-operation of the local people and the utilization of the facilities provided. *J. Taylor*

LAHIRI, S. C. **Chemotherapy in Cholera.** *Brit. Med. J.* 1951, Mar. 10, 500–504

A clinical trial was undertaken on the value of sulphaguanidine, formosulphathiazole [see this *Bulletin*, 1948, v. 45, 601] and formosulphacetamide in the treatment of cholera. The same dosage of the three compounds was given *viz.*, 4 gm. initially followed by 2 gm. every four hours throughout the day and night, for an adult, until symptoms subsided or the stool became vibrio-free. All patients received the usual saline transfusion treatment in addition. Of 268 patients observed, 72 received sulphaguanidine, 64 formosulphathiazole and 61 formosulphacetamide : a fourth group of 71 was taken as control. The mortalities in the four groups were respectively 30·5 per cent., 34·3 per cent., 34·3 per cent. and 18·3 per cent., the mortality being less in the controls than in the treated cases. The lower mortality rates in the untreated were shown in all age groups.

Cultures from the stools of all treated cases examined were negative after the 10th day (except in one patient who was discharged and not further examined). Out of 36 controls, 34 were negative after the 10th day, the vibrio persisting in two cases until the 12th day.

The day-to-day observations on the numbers of persons becoming vibrio-free showed only negligible differences in treated and controls. The drug did not appear to have any appreciable vibriocidal effect *in vivo* in this series.

" The failure of chemotherapy in cholera is not altogether unexpected from the nature of the disease itself, with its sudden onset and profuse vomiting and purging, which rapidly produce a condition of marked dehydration and serious systemic biochemical changes. There also occurs a great fall in the systolic blood pressure, resembling shock. It is not only the loss of systemic fluid but also the absence of sufficient filtration pressure in the glomeruli of the kidneys that produces the anuria. In many cases a quick supply of fluid and salt rapidly improved both dehydration and the low blood pressure, but in others, especially in late cases, circulatory collapse becomes irreversible. Chemotherapy cannot be expected to influence the above condition except possibly by way of prevention of the development of the disease initially. Once the disease is fully developed the most important factor in its treatment is undoubtedly an adequate supply of fluid and salt, and efforts should be made to prevent collapse becoming irreversible." *J. Taylor*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

BRANDIS, H. & PÖHN, H. P. Über eine einfache Methode zur Amöbenfärbung. [**Simple Method for Staining Amoebae.**] *Klin. Woch.* 1950, Dec. 1, v. 28, Nos. 45/46, 788, 4 figs.

The authors recommend the following staining method for the identification of human intestinal amoebae and their cysts in a faecal preparation.

A drop of serum is placed on a slide and a portion of faeces is teased up in it with the help of a platinum loop, after which a smear is made and, while still moist, the slide is rapidly immersed in a mixture of methanol with glacial acetic acid (5 per cent. of total volume). After fixation for 3–5 minutes, the smear is stained for 2–3 minutes in Weigert's iron haematoxylin, washed in tap water, and differentiated in acid alcohol until the preparation assumes a reddish tint (up to 1 minute). The preparation is then "blued" in tap water for 10–30 minutes. If a coverslip is placed on it, the preparation can be examined immediately, or it can be dehydrated, cleared and mounted in Canada balsam in the usual way for subsequent examination.

It is claimed that this method reveals the structure of various amoebae better than other rapid staining methods (*e.g.*, Mayer's and Delafield's).

C. A. Hoare

PLOOIJ, M. & WÜSTEFELD, P. Amoebiasis. Ervaringen op diagnostisch en therapeutisch gebied bij 225 patiënten. [**Diagnostic and Therapeutic Experience in 225 Cases of Amoebiasis.**] *Nederl. Tijdschr. v. Geneesk.* 1950, Dec. 9, v. 94 (iv), No. 49, 3532–40. English summary (6 lines).

HAMED, A. **A Diagnostic Feature of Amoebiasis in the Stools of Egyptians.** *J. Roy. Egyptian Med. Ass.* 1950, v. 33, No. 12, 966–9.

The author questions the value of the presence of Charcot-Leyden crystals in faeces as a factor in the diagnosis of amoebic dysentery.

In Egypt, he examined 380 cases between May and September and found that the stools of 273 (71·8 per cent.) contained a variety of helminthic and protozoal parasites. In 88 of these positive stools (32·23 per cent.) triple phosphate crystals and *Trichomonas hominis* were found, but Charcot-Leyden crystals were found in only 9 (3·3 per cent.). In only 2 of these 9 cases was *E. histolytica* found. On the other hand, in 57 of the 88 cases (64·7 per cent.) with triple phosphates and *Trichomonas*, *E. histolytica* was present. Triple phosphates and *Trichomonas* were found without *E. histolytica* in 31 cases (35·3 per cent.) of the 88.

In the author's view, so far as Egypt is concerned, Charcot-Leyden crystals are "more an accompaniment of ancylostomiasis and bilharziasis than amoebiasis". He considers that "the worth of the presence of triple phosphate crystals alongside *Trichomonas intestinalis* in fresh stools far outweighs that of Charcot-Leyden crystals as an auxiliary factor in deciding a diagnosis." [It would be difficult to draw any specific statistical conclusions from these limited groups of findings in the form in which the figures are presented.]

H. J. O'D. Burke-Gaffney

BROUNST, G. & ANSTRE, B. Les formes latentes de l'amibiase. Leur importance en médecine et en particulier en hématologie. [**Importance of Latent Forms of Amoebiasis, especially in relation to Haematology.**] *Semaine des Hôpit. de Paris.* 1950, June 10, v. 26, No. 43, 2070–72.

Latent amoebiasis is much more common than is believed. There are many cases of it in France; some patients have acquired their infections overseas, others in France.

In patients under investigation for various blood troubles, chiefly anaemia, latent amoebiasis was considered to be the causative factor in a number of cases. Details of some of these are given. In addition to anaemia latent amoebiasis was held to account for a variety of other troubles ; these included asthenia, pyrexia, pruritus, psychasthenia and, in the case of a child aged 8 years, stunting with hepato-splenomegaly and fever. Examples of these are cited. In every case treatment, first with emetine and then with enteriovioform and stovarsol, in conjunction with other drugs, afforded relief of the symptoms and, apparently, eradicated the parasitic infection. *A. R. D. Adams*

Struve, E. E. **Amebic Abscess of the Liver.** *California Med.* 1950, Aug., v. 73, No. 2, 178–80.

This is a review of the records of 50 cases of amoebic abscess of the liver in patients admitted to Gorgas Hospital, Ancon, Canal Zone, between the years 1920 and 1945, and appended are two case histories of patients treated by the author in 1947 and 1948 in Northern Peru.

In this list of 50 cases amoebic abscess was diagnosed on clinical grounds in eight cases. Diagnostic aspiration proving negative, all were treated with emetine and responded satisfactorily.

The incidence was highest between the ages of 20 to 40. There were no cases in persons under 21 years of age, and only one patient was a woman.

A list of complaints is given as follows :—

Pain in right upper quadrant of abdomen	18
Generalized abdominal pain...	9
Pressure pain in right side of chest	4
Fever	4
Dysentery	3
Pain in left shoulder and epigastrium ...	2
Pain in right side of back	1

Several patients had symptoms and clinical findings of an obscure nature, but abscesses were not demonstrated in them, or did not develop, until four or six weeks later. One had symptoms of acute appendicitis. At operation the appendix was found to be normal, but two weeks later abscess of the liver developed. Yet another was admitted with a complaint of fever and chills. On admission he was found to have benign tertian malaria and was treated accordingly, but a few days later symptoms referred to the upper quadrant of the abdomen were noted. Exploratory aspiration was performed and an amoebic abscess was found and drained.

A helpful physical sign was the reaction to finger percussion over the liver area of chest and abdomen. At the point of maximum tenderness the aspiration needle was introduced. Operative procedure to drain the abscess was carried out in 39 out of 42 patients in whom diagnosis was established. Six of the 39 (15·2 per cent.) died and five of them were found to have multiple abscesses. In 34 with solitary abscess, who were operated upon, there was one death (2·9 per cent.).

Cases of multiple abscesses of various sizes and distribution were difficult to manage, and all such patients died.

It is concluded that the prognosis for patients with a single amoebic abscess of the liver should approach 100 per cent. of cures in any series and it is recommended that the treatment by repeated aspiration of the abscess and subcutaneous injections of emetine should be considered the method of choice.

P. Manson-Bahr

BONNIN. Aspects et nouveaux traitements de l'amibiase en France. [**Some Aspects and Modern Treatment of Amoebiasis in France.**] *J. Méd. de Bordeaux.* 1951, v. 128, Spec. No., 191–8.

The treatment of amoebiasis is influenced by (1) the relationship of the parasite to the organ it infests, (2) the presence of concomitant bacterial infections, and also of secondary bacterial infections of the amoebic lesions, and (3) the anatomical and functional changes resultant on the lesions. Cysts, after being swallowed, excyst in the caecum or, sometimes, lower in the colon ; amoebae excysting in the caecum may rest there temporarily, or they may remain there as saprophytes of the non-pathogenic *Entamoeba minuta* type. These amoebae form cysts which escape in the stools ; according to some workers the cysts may excyst lower down in the colon, according to others they must pass to a new host before they can excyst. The amoebae in carriers can be assailed by amoebicidal drugs which come into direct contact with them but which would not reach amoebae actually invading tissue.

In some carriers the non-pathogenic *E. minuta* become tissue-invading *E. histolytica*, which cause characteristic lesions in the bowel wall. The amoebae in the tissues do not contain cellular debris or red cells, but they do so when passed in the mucoid stools.

The saprophytic *minuta* type may change to the pathogenic *histolytica* type in the presence of certain bacteria of undetermined identity. Probably these bacteria damage the mucosa, or they disturb the biochemical equilibrium of the bowel, and produce a colitis which favours the change to pathogenicity of the parasite. It is for this reason that antibacterial drugs (the sulphonamides and antibiotics) are associated with amoebicidal drugs in treatment.

It may be that bacteria in cultures of amoebae *in vitro* provide vitamins necessary for the development of the parasites ; but the presence of bacteria is not essential to their growth, crushed tissues can effectively be substituted for them.

Either spontaneously for some unknown reason, or after treatment, the tissue-invading activity of the parasite may cease ; the ulcers heal, leaving permanent scars ; the function of the colon is impaired ; and there is a subsequent chronic colitis which may be mild or, more often, is severe. The passage of cysts may indicate the origin of this chronic colitis ; but their presence is by no means constant, there may be long " negative phases " during which no cysts can be recovered from the stools. A chronic colitis, an associated liver involvement, and a wide variety of symptoms, rather than frank amoebic dysentery, are the manifestations in autochthonous cases of amoebiasis in France. These are treated palliatively and non-specifically ; emetine may or may not benefit them. True dysentery, caused by invasion of the bowel tissues by the parasites, is associated with the passage of haematophagous amoebae in the stools, but never with the passage of *minuta* forms or of cysts. Such attacks should be treated specifically with emetine.

Attention is then devoted to the preparations available [many proprietary], and the methods of their employment, in the treatment of dysenteric attacks and the subsequent eradication of the infection [which the author regards as always problematical].

[This paper should be consulted in the original by those interested.]

A. R. D. Adams

DO PRADO, F. C. Terapêutica da amebíase. [**Treatment of Amoebiasis.**] *Rev. Brasileira Med.* Rio de Janeiro. 1950, Dec., v. 7, No. 12, 809–11.

This is a lecture in a revision course held at the São Paulo hospital and describes the plan of treatment which the author has found successful

in his practice. His scheme is as follows : The whole course for a case of chronic amoebiasis lasts for 4 months ; he gives iodine preparations and arsenicals alternately for 3 weeks in each month ; thus, for the first month, iodine (as enterovioform, yatren etc.) for the first week, pentavalent arsenicals (as carbarsone or enterostovarsol) for the 2nd week, and iodine for the 3rd week ; during the last week of the month sulphonamides, bacteriophages, etc., are given. In the 2nd month, the same principle is observed, but the drugs are reversed—arsenicals for the 1st and 3rd weeks, iodine for the 2nd week ; the third month repeats the scheme of the first and the fourth repeats that of the second. At the same time attention is paid to the diet, which should be largely protein, and local treatment by enema, *e.g.*, of yatren, administered at night for retention.

This line of treatment has been followed for 5 years, in 400 private and 140 hospital cases. As the latter are under better and closer observation, they alone are referred to and it is claimed that good results were obtained in 98 (70 per cent.) ; that is, there was clinical cure, repeated examination of the stools failed to discover the entamoeba even after a purgative. In another 17·1 per cent., though no entamoebae were found, clinical recovery was incomplete, and in 12·9 per cent. signs of chronic colitis persisted, though no amoebae were seen. [See also this *Bulletin*, 1949, v. 46, 940.] *H. Harold Scott*

CONAN, N. J., Jr. **Sontoquine Naphthoate in Amebiasis.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 18–19.

The author refers to his own findings and those of others, noted from time to time in this *Bulletin*, that the activity of chloroquine is good in hepatic amoebiasis, but poor in the intestinal form. Sontoquine, 3-methyl-7-chloro-4-(4-diethylamino-1-methylbutylamino) quinoline is another 4-aminoquinoline derivative comparable to chloroquine in its antimalarial activity [this *Bulletin*, 1947, v. 44, 1106]. The diphosphate of chloroquine and the bisulphate of sontoquine are absorbed from the intestinal tract to about 90 per cent. with faecal excretion of about 10 per cent. of the oral dose, but the naphthoate of sontoquine is absorbed to only about 80 per cent. and the faecal excretion is approximately doubled.

The author therefore tried this latter salt against amoebiasis in the hope that, if it proved amoebicidal in man, it might be superior in intestinal infections.

Six adult patients with proved intestinal amoebiasis were given 0·3 gm. (base) of sontoquine naphthoate daily for 14 days. No toxicity was noted. Three of the patients lost their symptoms, but amoebae persisted in the faeces. In the other three, no amoebae were found after frequent faecal examination during 6 months.

In one of the latter patients, hepatitis was present. The cholecystogram was normal and there was 20 per cent. retention of bromsulphthalein at 30 minutes. During treatment the signs and symptoms disappeared in 3 to 4 days and a week later there was no retention of bromsulphthalein at 30 minutes.

The author considers that these results indicate that sontoquine has quantitatively the same activity in human amoebiasis as chloroquine and that the hypothetical advantage of employing the naphthoate salt of sontoquine is clinically inapparent. *H. J. O'D. Burke-Gaffney*

WATT, J. Y. C. & VANDEGRIFT, W. B. **Laboratory Observations on the Actions of Aureomycin, Circulin, Polymyxins B, D, and E on *Endamoeba histolytica*.** *J. Lab. & Clin. Med.* 1950, Nov., v. 36, No. 5, 741–6. [12 refs.]

The authors report the results of experimental studies on the effect of five antibiotics (aureomycin, circulin, polymyxins B, D, E) on *Entamoeba histolytica*.

The amoebae were isolated in 1949 from the stools of seven patients and have been maintained in culture in a diphasic medium made as follows. First, 33 gm. of Difco "Endamoeba medium" were dissolved in 1 litre distilled water; then the solution was distributed in 7 ml. amounts into test-tubes, which were autoclaved and slanted; finally, the slants were covered with 2 ml. of dilute human serum in saline (1 : 10), and rice powder was added. Amoebicidal tests *in vitro* were made by diluting each antibiotic in 1·5 ml. of the overlay and adding 0·5 ml. of a suspension of amoebic culture. The test cultures were incubated and examined at intervals of 24, 48 and 72 hours for viable amoebae. Their viability was determined by their motility, size and enclosed rice particles, as well as by control cultures made for each test. The accompanying bacterial flora was studied in two of the strains of amoebae, in which the following organisms were found: (1) *Streptococcus faecalis*, *Pseudomonas* sp. and *Micrococcus* sp.; (2) *Bact. aerogenes*, *Bact.* sp., and unidentified beta haemolytic Gram-negative bacillus and *Corynebacterium* sp. The viability of the bacteria was established in each test by cultural methods.

The results of the *in vitro* tests are given in four tables, from which it is seen that polymyxin B and aureomycin possessed the highest amoebicidal activity; polymyxin E was not so effective, and polymyxin D and circulin were the least active. There was a critical range of concentration for each antibiotic at which it was amoebicidal without killing the concomitant bacteria. Furthermore, in certain high dilutions each of the antibiotics prolonged the growth of amoebae from the normal period of 7–8 days to periods up to 24 days. Two strains of *E. histolytica* developed a slight rise of aureomycin-resistance. It was noted that the slight amoebicidal action manifested by polymyxin D and circulin separately, was raised when the two antibiotics were combined.

Finally, aureomycin was used for the treatment of 6 cases of amoebiasis, the patient receiving 7–10 gm. in divided doses over a period of 4–5 days. After 3 days of 5–6 gm. aureomycin, microscopic examinations and cultures of the stools from the patients failed to show *E. histolytica*, and remained negative during the whole period of observation (20–25 days).

C. A. Hoare

See also p. 520, Most, **Recent Advances in the Therapy of the more Common Protozoan and Helminthic Infections of Man.**

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Berks, G. & Goodwin, L. G. **Terramycin and *Spironema duttoni* Infections..** [Correspondence.] *Nature.* 1951, Mar. 17, 447–8.

Mice inoculated intraperitoneally with blood from a mouse heavily infected with *Sp. duttoni* usually died in 3 to 6 days : in those which survived a relapsing infection followed.

Mice thus infected were treated with terramycin on the day after infection : the antibiotic was given either subcutaneously or by stomach tube.

Survival of all mice followed the administration of 12·5 mgm./kgm. subcutaneously, but the parasitaemia recurred six days later. With 25 mgm./kgm. all mice were cured and no relapses occurred over 9 weeks. Suspensions of their organs intraperitoneally failed to infect other mice.

Terramycin proved to be 40 times as potent, weight for weight, as penicillin : a single subcutaneous dose of 1,000 mgm./kgm. of water-soluble penicillin (calcium salt) did not prevent relapse after 11 days.

Single doses of 200 mgm./kgm. terramycin by mouth prevented the death of mice during the initial parasitaemia, but relapses occurred : five daily doses of 200 mgm./kgm. produced complete cure over a period of 6 weeks' observation.

H. J. O'D. Burke-Gaffney

COGHILL, N. F. **Treatment of Tick-borne Relapsing Fever, Neoarsphenamine and other Remedies.** *Lancet.* 1951, Mar. 17, 604–5. [45 refs.]

Records of 82 cases of this disease, occurring among military personnel in Cyprus in 1942–1943, are reviewed. In 7 instances, although the diagnosis was not confirmed on blood examination, the clinical diagnosis was that of undoubted relapsing fever. Sixty-three cases were in Indians.

The preparations of neoarsphenamine used were "Sulphostab" and "Novostab", given intravenously. One patient with facial paralysis was given tryparsamide, bismuth, and potassium iodide, presumably in addition to arsenicals.

The author remarks that there is a general opinion that neoarsphenamine should be given as the temperature is rising, although on theoretical grounds there does not appear to be much to support this belief. Where, however, a single dose only is administered this is best given early in a febrile attack. A single dose was given in 46 cases and multiple doses in 36. There was no evidence that any patient suffered hepatic or other damage from the doses used in this series.

The cases are divided into seven groups, according to the dosage and number of injections given :—

A. One injection of 0·45 to 0·6 gm. (46 cases).
B. 0·6 gm. followed by 0·6 gm. eight days later (1 case).
C. 0·3 to 0·45 gm. followed by 0·45 to 0·6 gm. (12 cases).
D. 0·3 gm. followed by 0·45 gm. after five days and 0·6 gm. after seven days (14 cases).
E. Three doses of 0·6 gm. at intervals of seven days (2 cases).
F. 0·3 gm., 0·6 gm. after five days and 0·6 gm. after seven more days (4 cases).
G. 0·6 gm., then 0·6 gm., 0·45 gm., 0·45 gm., at five- or six-day intervals respectively (3 cases).

Initial doses were usually given during fever.

The relapse rate was 50 per cent. after one injection, 38·5 per cent. after two, and 17·4 per cent. after three or four (in 23 cases). The author remarks that there is some evidence that different strains of spirochaetes vary in their reaction to arsenicals.

Mention is made of the use of sodium potassium bismuth tartrate, stovarsol, tryparsamide, gold compounds, antibiotics and oxophenarsine (Mapharsen). Of these it is considered that the last deserves more extended use. Penicillin appears to give disappointing results and streptomycin and aureomycin have not been sufficiently tried out. With multiple doses of neoarsphenamine the author recommends doses of 0·45 gm. to 0·6 gm. to begin with, followed by 0·6 gm. at intervals of not more than seven days, but on the whole thinks the response to this drug is unsatisfactory.

[In treating the Central African type of relapsing fever the reviewer has found the following course of novarsenobillon given intravenously to give good results. Commencing dose of 0·45 gm. followed by five further doses of 0·6 gm. at six-day intervals, treatment being started as soon as the diagnosis is made and irrespective of the temperature chart.] *C. F. Shelton*

PIERQUIN, L. Relation de quelques essais concernant l'efficacité, sur *Ornithodorus moubata*, de trois insecticides à base de l'isomère " Gamma " de l'hexachlorure de benzène. [**Comparative Trials of the Insecticidal Action on *O. moubata* of Three Preparations of *Gamma* Benzene Hexachloride.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Sept. 30, v. 30, No. 3, 553–64.

Laboratory experiments were undertaken to investigate the effectiveness of three preparations of gamma BHC for killing *Ornithodorus moubata*. In some tests, the preparations were mixed with dry sand, in different proportions, and the ticks were added to the respective tubes which were closed with cotton wool. In other tests, the ticks were buried in 6 cm. of sand in a dish of 175 sq. cm. surface ; the BHC preparations were then sprinkled over the surface or watered on in suspension (5 per cent. in water), 100 ml. being used for each dish.

In the tube tests, the ticks were mostly killed in 6–12 hours by concentrations down to 1 per cent. ; in the dish tests, the ticks mostly died in 2 to 4 days.

The three preparations were :

(1) " Hexidole Geigy " (containing 40 per cent. BHC, according to the author).

(2) " Gamatox Vermin Powder " [understood to contain 0·5 per cent. gamma BHC].

(3) " Agrocide No. 7 " [understood to contain 2·5 per cent. gamma BHC].

The author states that 1 and 2 are very similar in action but 3 is considerably slower in its effect. [These results do not tally with their *gamma* BHC content !] He recommends a 2·5 per cent. suspension of Gamatox in water for spraying African houses against ticks, applying 200 ml. per sq. metre. For European houses, where the smell of crude BHC would be objectionable, he suggests the use of Gamatox Household spray instead. Either should be applied monthly to floor, walls and ceiling. *J. R. Busvine*

HUDEMANN, H. & MÜCKE, D. Zur bakteriologischen Diagnostik des Sodoku. [**The Bacteriological Diagnosis of Rat-Bite Fever.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, Dec. 29, v. 156, No. 4, 252–7. [26 refs.]

Rat-bite fever has not been reported in Germany for 17 years though cases have been described in England, U.S.A., France, Czechoslovakia, Sweden, Italy and Lithuania. Though commonly described as resulting from the bite of a rat, cases have been reported following the bite of cat, polecat, weasel, dog, etc., usually animals whose habits of life expose them to the risk of rat-bite.

In a year favourable to increase of the murine population, the so-called " mouse year ", during which the numbers of the murines may be enormous, there is a danger of an increase in the number of cases of diseases transmitted by rats and mice.

A case of rat-bite fever is described in a child 7 years of age who was bitten on the foot by a water rat (*Arvicola scherman*, Shaw). The usual symptoms of rat-bite fever followed and cure was rapidly effected by treatment with penicillin. Spirilla could not be demonstrated in the peripheral blood but the serological tests (Wassermann reaction, Kahn and MKR II tests) were doubtful or positive. White mice and guineapigs inoculated with blood taken both during an apyrexial interval and during the height of the pyrexia revealed *Spirillum minus*.

With the use of infected animals further inoculation and serological experiments were carried out to determine the optimum methods for diagnosis, as a result of which the authors conclude that both inoculation and serological tests on the inoculated animals are necessary. They advise that a thick drop of irritation serum from the site of the bite and material obtained by puncture of the regional lymph nodes should be examined by dark-ground microscopical

examination. Venous blood should be taken for inoculation of white mice and guineapigs and for serological tests. The animals may be inoculated either by the subcutaneous or the intraperitoneal route. A thick drop of blood from the animals is examined every three days for three weeks or until spirilla appear. If the blood remains negative the examination should be continued for two more weeks. One hundred fields should be examined under the microscope from each. On the 12th to the 14th day blood obtained from cardiac puncture should be taken from the guineapigs for serological tests and their general condition should be noted. Emaciation, conjunctivitis and loss of hair suggest infection by *Spirillum minus*. If the serological reactions are positive but no spirilla are found in the blood, the animals are killed and emulsions of the liver, spleen and kidneys are injected into white mice.

Spirilla appear first between the 12th and 19th days, usually the 14th and are most numerous between the 12th and 14th days, decreasing in number until the third week, after which they can always be found in small numbers. They never disappear ; once a mouse becomes positive it remains positive. Serological tests become positive between the 10th and the 18th days, usually the 12th to the 14th days.

By these methods a diagnosis of rat-bite fever can be diagnosed at the earliest period and proper treatment instituted. *P. A. Clearkin*

Toušek, M. **Sodoku.** *Časopis Lékařů Českých.* Prague. 1951, Mar. 9, v. 90, No. 10, 312–15, 2 charts. [14 refs.]

The English summary appended to the paper is as follows :—

" A case of Sodoku (rat-bite fever) is described in a male, aged 63, who suffered from regularly recurring fever with exanthem for a period of 1½ years. Shortly before the onset he had been bitten by a domestic rabbit. The patient had a typical temperature curve and exanthem, a negative WR and an increased BSR. Spirella minor [*sic*] was found in the thick blood-drop preparation after prolonged searching. Inoculation into a mouse was unsuccessful. The white blood count was followed daily and showed fluctuations, according to Schilling's biological curve, which lagged behind the temperature changes.

" The patient was successfully treated with small doses of neosalvarsan. The temperature returned to normal after 0·3 gm. Streptobacillus moniliformis may cause another type of rat-bite fever. It is not only transmitted by a bite but also orally. It is sensitive to penicillin.

" It is important to note diagnostically that in this case the Spirella was conveyed by the bite of a domestic rabbit and rabbits are very common pets in this country."

YAWS

Silva, F. Dados históricos sôbre a bouba na Bahia. Distribuição atual da doença no estado. [**History of Yaws in Bahia. Present Distribution.**] *Arquivos Univ. Bahia Facul. de Med.* 1949, v. 4, 77–90, 7 pls.

Yaws has been reported in Bahia since the early years of the 17th century and affected not merely the Indians and the slave community but immigrated Europeans, Portuguese and Belgians. At present, however, cases are few ; thirteen municipalities are named as providing cases. In the capital none has been reported for a long time and most of the places where they are seen are in

the southern part of the State and most are introduced by immigrant miners *e.g.*, at Xique-Xique on the borders of S. Francisco and coming in from Minas Gerais where the disease is rife.

Treatment hitherto has been by arsenicals and bismuth, but now penicillin is superseding them. Photographs illustrate the condition. *H. Harold Scott*

LOUGHLIN, E. H., JOSEPH, Aurèle & SCHAEFFER, Katherine. **Phase Contrast Microscopy for Demonstration of *Treponema pertenue* in Yaws Lesions.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 26.

Living *Treponema pertenue* from primary and secondary yaws lesions in Haiti were studied by means of a Winkel-Zeiss contrast microscope with a 90× condenser phase ring and a 90× oil immersion phase objective. A green monochromatic filter or neutral density filter was used.

" On examination with the phase contrast microscope of fresh preparations in physiological salt solution, the *Treponema pertenue* normally are seen to be delicate spiral organisms measuring from about 14 to 20 microns in length. They have between twelve and sixteen regular turns with distances between the spirals of about one micron. During quieter phases they are seen to possess almost straight or slightly kinky tapering ends. These spirochaetes normally are very actively motile with constant rotation on their long axis. They have a moderately rapid translational movement which is well sustained until some debris or cells are encountered and to which they may become temporarily attached. At these times the organisms exhibit considerable flexibility, bending until the ends meet, and elasticity, stretching until the spirals almost disappear and then quickly shortening to resume their normal configuration. Occasionally when two or three treponemata meet they entwine each other and then apparently struggle to get free by separating along half their length to form an undulating " Y " or by sliding along their longitudinal axes to appear momentarily as extremely long spirochaetes until they part company. During all of these movements the spiral rotation is maintained although apparently varying from time to time in direction." *C. J. Hackett*

RIBAS, E. B. & TAVARES, A. Testes sorológicos quantitativos em bouba, [**Quantitative Serological Tests in Yaws.**] *Hospital.* Rio de Janeiro. 1950, Nov., v. 38, No. 5, 771–7, 4 figs. English summary.

Of the many serological tests for yaws (and syphilis) the authors prefer the Kahn quantitative reaction. They show that in yaws the reaction varies much from time to time and a fall in the titre indicates the possibility, or probability, of relapse and the need for boosting treatment. They, therefore, advise [a counsel of perfection which could not often be carried out] regular quantitative tests every 3 to 4 weeks with a view to anticipating any change and dealing with it in good time. *H. Harold Scott*

GUIMARÃES, F. N. **The Clinical Development of Yaws in Baixada Fluminense State of Rio de Janeiro, Brazil.** *Puerto Rico J. Pub. Health & Trop. Med.* 1950, Sept., v. 26, No. 1, 1–34, 2 maps & 15 figs. [Refs. in footnotes.] [Spanish version 35–54.]

This good general description is based upon a study of over 1,000 patients. There are some points of particular interest. Yaws was often more frequent in the sierras than in the plains. Experimental studies showed that the incubation period was 15–35 days with an average of 26·5 days. Ulceration in primary lesions is usually the result of secondary infection and may later become the

" seat of destructive tertiary lesions ". Primary lesions, unlike secondary ones, are painful and leave scars. Joint and bone pain, headache, lassitude and sometimes fever may accompany the primary lesions. Regional lymph glands are enlarged and the author has found treponemata in them in two patients. Serological reactions are usually positive within two months after the development of the primary lesions.

In the secondary stages mucous membrane lesions were observed only once each in the vagina and on the upper lip. The secondary stage lasts 2–5 years and secondary eruptions are rare after 6 years and exceptional after 10. There may be two or more relapses separated by latent periods. Atypical closed lesions are probably of allergic origin and are frequently confused with syphilides. Treponemata were only exceptionally found in them. They may assume various forms such as psoriasiform, pityriasiform, lichenoid, roseolar macules, disseminated micropapular eruptions and broad hypochromic and slightly desquamated areas. Bowing of the long bones, particularly of the tibia (sabre tibia), is " a common observation ". In children between 10–14 years of age bowing is frequently combined with a separation of the anterior tibial tubercle, as in Osgood-Schlatter's disease. Periostitis, osteo-periostitis and rarefactions may occur.

Only about 25 per cent. of cases pass into the tertiary stage. " Gummato-ulcerative lesions involve the lymph vessels, obliterating them and producing, in that way, what is known as bubatic elephantiasis." Bone lesions include " osteo-periostitis, zones of rarefaction, frank necrosis with osteomyelitis and elimination of sequestra ". Joints may become ankylosed. Bone lesions may ulcerate through the skin but more often the involvement of the bone follows the skin lesions. Sabre-tibia " is also part of the tertiary stage ". Including secondary cases bone lesions were found in less than 10 per cent. of his cases but he suggests that the real incidence is probably higher. In three tertiary cases there were lesions of the skull.

Extensive hyperkeratosis of the palms and especially the soles, in the proportion of 1 : 10, are the most frequent tertiary lesions and may be extremely painful especially when accompanied by " fissures that ooze a colourless fluid ". Sometimes tertiary hyperkeratosis extends to the dorsum of the hands and feet, and even to the lower third of the forearms and legs. When accompanied by pigmentary changes, it presents a clinical picture known as ' pintoid yaws ', which may be indistinguishable from tertiary pinta. At other times the border and dorsum of the feet may be covered by horny spines. Such a process, when associated with elephantiasis, resembles the ' mossy foot ' syndrome described by Thomas." It is suggested that plantar hyperkeratosis is conditioned by local (occupational trauma) or general factors (racial peculiarities). Palmar hyperkeratosis is often accompanied by a permanent contracture of the little finger, which Pronk [this *Bulletin*, 1942, v. 39, 41] considers typical of tertiary yaws. Extensive erythematous and scaly patches with moderately well-defined margins, most frequently on the arms and legs, may also occur in the tertiary stage and are often associated with plantar hyperkeratosis.

Ten cases of gangosa were observed. One healed rapidly when treated with penicillin. Gangosa is most frequent in adults but can develop in children. Well-defined goundou was not seen and the author believes it is not due to yaws.

Juxta-articular nodules were seen in 21 patients. These were all adult negroes with plantar hyperkeratosis. They are regarded as tertiary yaws lesions.

The Wassermann reaction was positive in all except 12 of 255 patients with various manifestations. These comprised 2 primary cases and 10 latent cases.

[There is some confusion in the numbering of the figures, the 15 of which really comprise 62 illustrations. The so-called "pintoid yaws" has been described in Africa by ZIEMANN under the name of "*mbelung*" which is probably less likely to lead to confusion [HALLENBERGER, this *Bulletin*, 1921, v. 18, 257]. The article is a useful statement in English of Brazilian work but one would have liked more data in support of some of the statements.]

C. J. Hackett

i. LOUGHLIN, E. H., JOSEPH, Aurèle & SCHAEFFER, Katherine. **Aureomycin in the Treatment of Yaws.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 20–23.

ii. SCHAEFFER, Katherine, LOUGHLIN, E. H. & JOSEPH, Aurèle. **The Effect of Orally Administered Aureomycin on *Treponema pertenue* in Man.** *Ibid.* 24–5.

i. This is a report of treatment of 30 cases of yaws of which 5 were in the tertiary stage in hospital in Haiti. Aureomycin, to a total dosage of 10 grammes, was given by mouth in one of two courses, namely, 2 grammes once daily for 5 consecutive days, or 5 grammes, 3 grammes and 2 grammes on three consecutive days.

In infectious lesions, spirochaetes had diminished after 2 hours and had disappeared 48 hours after treatment had begun. Secondary bacterial infection was also greatly reduced. Secondary lesions started to heal within 24 hours and by the 5th–6th day "most of the crusts had become detached". The pain of dry palmar and plantar lesions subsided in 1–5 days.

In tertiary lesions the response was also good, but not as rapid as in secondary lesions on account of the destruction. In some patients with extensive and crippling lesions, the relief of pain and improvement of movement after 5 days was remarkable. In some tertiary cases aureomycin was dusted on the ulcers with hastening of healing.

The "systemic manifestations of yaws were completely relieved within 48 hours". Nausea and vomiting occurred in two children aged 7 to 8 years after 8 and 10 grammes respectively.

"The healing responses and the clearing of secondary yaws with 10 grammes of aureomycin were as rapid and as marked as we have seen with massive doses of penicillin." Repository intramuscular injections of aureomycin might provide an improved method of mass treatment of yaws.

All patients were sero-positive before treatment started but no later results are reported.

In an addendum it is stated that after the 3-day course two patients relapsed, but an additional 70 patients had received the 5-day course and after at least 3 months later none had had clinical relapses.

ii. *Treponema pertenue* from secondary yaws lesions in Haiti were examined by phase contrast microscopy. The abnormal changes observed in order of appearance were (1) slower transitional movements and loss of flexibility, (2) closing of spirals and slowing of spiral rotation, (3) development of "nodulations or excrescences on the lateral aspects of the spirals" which increased in size and number, (4) "swelling of the sheaths around the treponemata", (5) with (3) there was "fragmentation of the spirochaetal body and coalescence of these nodulations until only several relatively large ones remained loosely suspended in a sac provided by the swollen sheath". At this time the organisms had lost all resemblance to the original treponemata. These changes, as well as the reduction in numbers, are now used in the routine assessment of anti-yaws substances. *C. J. Hackett*

LEPROSY

Buenos Aires. Reunión de Presidentas de las casas filiales y subfiliales del patronato de leprosos de la Republica Argentina. Primera Reunión del Patronato de Leprosos Internacional, Setiembre 3 de 1946. [**Meeting of the Branch Presidents of the Argentine "Patronato de Leprosos" and First Meeting of the International "Patronato de Leprosos", 1946.**] *Publicaciones Patronato de Leprosos de la Republica Argentina No. 23.* 183 pp., 1 plan. 1947. Buenos Aires : J. E. Uriburu 1018.

Innes, J. R. **Leprosy in Tanganyika. A Survey in the Southern Province.** *East African Med. J.* 1950, Dec., v. 27, No. 12, 459–65.

This is an account of sample surveys made in the Southern Province of Tanganyika Territory in line with a series of surveys made by the author in all the British territories of East Africa [this *Bulletin*, 1949, v. 46, 263, 638 ; 1950, v. 47, 365, 366 ; 1951, v. 48, 000]. This province has the highest leprosy rate in the Territory. The survey gives 26·5 per 1,000 which amounts to 23,500, more than the 20,000 estimated for the whole of Northern Rhodesia. The reasons suggested for this large number are the high humidity and the infiltration over the border of such tribes as the Mawiya.

Of the cases found, 23 per cent. were lepromatous, 51 per cent. tuberculoid, and the rest indeterminate, polyneuritic and mixed. "The general picture was that of a moderately severe leprosy, but well rooted in the community and slowly spreading."

To deal with these large numbers there are three leprosaria with 4,500 patients, of whom only 1,700 are in-patients.

The author estimates the number of cases in the countries he has so far surveyed : Uganda 80,000 ; Kenya 35,210 ; Tanganyika 100,000 ; a total of 215,210. *Ernest Muir*

Guyane Française & Inini. Rapport sur le Fonctionnement Technique de l'Institut Pasteur pendant l'Année 1948. Publication No. 188. pp. 38–53 ; 74–91. [23 refs.] Lèpre. [**Leprosy.**]

An account is given of epidemiological studies during 1948. Of the cases of leprosy found, 73 per cent. were of the tuberculoid or of the undifferentiated form. Only among the Europeans and Arabs did the lepromatous type preponderate. [For details of the number of cases see this *Bulletin*, 1950, v. 47, 1093.] *Ernest Muir*

Portugal, H. & Azulay, R. D. Vantagens de coloração pelo método de Gram-Weigert dos cortes de lesões lepromatosas. [**Value of Gram-Weigert Staining of Leproma Sections.**] *Rev. Brasileira Leprologia.* S. Paulo. 1950, Dec., v. 18, No. 4, 206–7.

The authors have examined leproma tissue sections by the Gram-Weigert and the Ziehl-Neelsen methods of staining. They give details of the procedure of the former as found in Mallory's *Pathological Technique* and state that Gram-positive organisms are always more numerous in the sections than are acid-fast bacilli. They go even further and record, as examples, four cases in which repeated examinations failed to reveal any acid-fast organisms, but in which Gram-positive organisms, few or many, and perhaps with granular staining, were seen. *H. Harold Scott*

Basombrío, G., Gatti, J. C., Cardama, J. E. & Colombo, C. V. Modificaciones de la lepromino reacción. [**Changes in the Lepromin Reaction.**] *Internat. J. Leprosy.* New Orleans. 1950, Oct.–Dec., v. 18, No. 4, Pt. 1, 481–6. English summary.

Generally speaking, the lepromin reaction is positive in the tuberculoid form, negative in the lepromatous form. It has been affirmed by many that the result of the test remains unchanged while the disease is undergoing evolution. Others have stated that the result may change from negative to positive, but deny that the reverse can occur.

At the First International Congress on Leprosy, held in Rio de Janeiro in 1949, recommendation was made for a fresh study of this question among patients and cohabitants. The authors have examined 345 patients and cohabitants who had received no sulphone treatment and they found that 8 (2·3 per cent.) showed variations, 5 of the tuberculoid type, one of the intermediate and two of those living with lepromatous patients. The changes were : marked positive (2+) to doubtful (±) two cases ; 1+ to ± two cases, — to 1+, one case. The intermediate changed from ± to 2+, and the two cohabiting from 1+ to —.

Of 69 others who had received treatment with diasone, 5 with the lepromatous type, 2 intermediate, and one tuberculoid showed a change in the reaction. Of the 5 lepromatous cases 3 changed from — to ± and two from — to 1+ ; the two intermediate who, incidentally, improved clinically, changed from — to 1+, while in the tuberculoid patient the lesion disappeared and the reaction changed from ± to 1+. But four of them did not submit to the treatment regularly and during the periods of omitting treatment their clinical condition deteriorated and the reaction decreased.

Of the total 414 cases examined, 16 showed a change of reaction (3·86 per cent.) ; of eight who had not received sulphone treatment the reaction decreased in four, increased in two, and the two contacts with lepromatous patients decreased from 1+ to negative. *H. Harold Scott*

Gillet, J. Note sur quelques cas de lèpre (forme lépromateuse) traités par sulfones (Diasone et Sulphétrone). [**A Few Cases of Lepromatous Leprosy treated with Sulphones.**] *Ann. Soc. Belge de Méd. Trop.* 1950, Sept. 30, v. 50, No. 3, 441–7. [11 refs.]

Two advanced lepromatous patients were given 2 or 3 courses of diasone, each lasting about 3 months, with doses rising from 1 to 3 gm. Eight lepromatous patients in different stages were given 2 courses of sulphetrone. Each drug gave equally good results, and 7 out of the ten cases became bacteriologically negative. *Ernest Muir*

Dharmendra, Chatterjee, K. R. & Bose, R. **Diamino-Diphenyl-Sulphone (DDS) in the Treatment of Leprosy : Pharmacological Aspects.** *Leprosy in India.* 1950, Oct., v. 22, No. 4, 174–201, 8 graphs. [14 refs.]

The object of this investigation was to find the best mode of administration and dosage of the drug and the pharmacological aspects of oral and intramuscular dosage were studied. For this purpose the diamino-diphenyl-sulphone was used as powder or in tablet form and in 25 per cent. suspension in arachis oil with wax for parenteral administration. In all 68 advanced lepromatous cases, bacterially positive and lepromin negative, were treated. Blood levels, excretion in urine, and concentration of the sulphone in the skin, and other tissues were measured by the method of Brownlee *et al.* [*Bulletin of Hygiene*, 1948, v. 23, 399]. Changes in the blood picture and the presence or absence of urobilin were also noted. It was shown that after oral or intramuscular dosage

ranging from 10 to 200 mgm. daily (300 mgm. being found too toxic) the drug appeared in the blood after a few minutes and was still detectable 35 days after treatment ended. The rate of absorption was approximately equal by the two methods of administration, but the drug appeared to persist in tissues somewhat longer after the intramuscular dosage. By the latter method, however, induration and boils sometimes occurred at the site of injection and the oral route was preferred. More than half the administered dose was excreted in the urine and began to appear within 20 to 30 minutes. It was found that two divided doses daily were better than a single dose for maintenance of blood levels, which approximated to that in other tissues. The drug gave rise to haemolysis with consequent fall in the erythrocyte count and lowering of Hb. content. A feeling of weakness with burning sensation in the hands and feet was experienced by some patients, and mental depression was noted. *J. D. Fulton*

Cochrane, R. G. **Diaminodiphenylsulphone in Leprosy.** [Correspondence.] *Lancet.* 1951, Feb. 3, 289.

In this correspondence Cochrane expresses the opinion that the dosage of diaminodiphenylsulphone (DDS) recommended by Lowe in Nigeria [see this *Bulletin*, 1950, v. 47, 1000] is too high for the average patient in India. He recommends 600 mgm. per week administered as follows : (1) 50 mgm. a day (missing out Sunday) for 2 weeks, then 100 mgm. a day (missing out Sunday) ; or, alternatively, (2) 100 mgm. twice a week increasing by 100 mgm. a week each month till a total of 300 mgm. twice a week is reached. He recommends 50 per cent. sulphetrone watery solution by injection as being less toxic, and states that it would take years to establish the small safe dose of 300 mgm. per week as being effective bacteriologically. [It is important to regulate the dosage of DDS by the body weight. The average adult in Nigeria is at least 14 kgm. heavier than the adult in most parts of India. DDS has already been found bacteriologically effective in doses of 300 mgm. per week, or even less, in North India, but there a majority of adult patients of average weight will tolerate a daily oral dose of 150 to 200 mgm. 6 days a week.] *Ernest Muir*

Floch, H. & Destombes, P. Emploi de la Sulfone mère et du 1500 F par voies buccale et injectables (sulfones retard) dans le traitement de la lèpre en Guyane Française. [**Use of the Parent Sulphone and 1500 F by the Oral and Parenteral Route in the Treatment of Leprosy.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 206.* 1950, Mar., 7 pp.

This article is very similar to one already reviewed [this *Bulletin* 1950, v. 47, 1100.] The parent sulphone DDS is to be preferred to its derivatives because of its comparative cheapness and equal efficacy. Oral administration is generally preferred because of its simplicity, but if it is suspected that the drug is not being absorbed the intramuscular route may be substituted. Some hold that this route is less liable than the oral to cause lepra reaction. Exosulphonyl (1500F) is found to give even more rapid and spectacular results than DDS. It is given orally (1 gm. a day), intramuscularly or intravenously, the optimum dose being attained by graduated weekly increases. *Ernest Muir*

Floch, H. & Destombes, P. Conduite du traitement de la lèpre à l'aide de sulfones françaises (1358F et 1500F). [**Treatment of Leprosy with the French Sulphones 1358F and 1500F.**] *Méd. Trop.* Marseilles. 1950, Sept.–Oct., v. 10, No. 5, 851–7. [19 refs.]

This paper is in substance the same as that above.

GRAMBERG, K. P. C. A. Over de niet-specifieke therapei van lepra. [**The Non-Specific Treatment of Leprosy.**] *Med. Maandblad.* Djakarta. 1950, Dec. 1, v. 3, No. 12, 600–609.

HASHIMOTO, T., ADACHI, S., SATO, M. & HASEGAWA, S. **The Cepharanthin Treatment of Leprosy.** *Japanese J. Exper. Med.* 1950, Mar. 30, v. 20, No. 4, 461–72, 7 figs. (4 coloured) on 4 pls.

Cepharanthin, " an alkaloid of the biscoclaurin type ", first used in tuberculosis, has been used in leprosy since July 1942, and in the opinion of the authors is much superior to the former chaulmoogra treatment. They report FURUMI as giving 0·05 to 0·10 mgm. three times a week and getting 8 per cent. cure in tubercular [lepromatous] cases and marked effect in 65 per cent. ; also 84 per cent. of complete cures of macular cases. HAGATA, giving 0·001 mgm./kgm. body weight, obtained marked results. The present authors advise giving not more than 1·0 mgm. per week intravenously and 7·0 mgm. orally in lepromatous cases, and twice these amounts in the " anaesthetic-macular " type of leprosy.

Cepharanthin is said to cause signs of reaction only occasionally. Anaesthesia, thickening of nerves, and other conditions associated with the neural type clear up in a comparatively short time.

Of 64 patients, 34·4 per cent. were " markedly cured ", 35·9 per cent. showed improvement, 20·4 per cent. no improvement, and 9·3 per cent. became worse. Of the tubercular [lepromatous] cases 17·4 per cent. were " markedly cured " and 43·4 per cent. showed improvement, as compared with 51·6 per cent. almost completely cured in " macular " leprosy. [It is unfortunate that the usually adopted classification is not used.] Clinical and histological before-and-after illustrations are given. The histological are in colour ; they are excellent and show remarkable changes. *Ernest Muir*

KESKAR, A. Y. & BOKIL, K. V. **Syntheses of Antileprosy Drugs. Part II. Synthesis of dl-ω-Δ^2-cyclohexene undecylic Acid—an Analogue of dl-hydnocarpic Acid.** *J. Univ. of Bombay.* Sect. A. Physical Sci. 1950, Nov., v. 19, Pt. 3, 19–22.

NAIK, R. G., SHAH, M. T. & NARGUND, K. S. **Antileprosy Drugs. Part III. Benzyl-Alkyl-Acetic Acids.** *J. Univ. of Bombay.* Sect. A. Physical Sci. 1950, Nov., v. 19, Pt. 3, 54–9.

DE MELLO, I. F. Les principes de base d'une campagne antilépreuse. [**Fundamentals of an Anti-Leprosy Campaign.**] *Maroc Méd.* 1950, Nov., v. 29, No. 306, 967–72.

A general discussion.

MAURI, A. C. & HADLER, W. A. Ação dos colóides electronegativos sôbre e evolução da lepra murina. [**The Effect of Electronegative Colloids on the Development of Murine Leprosy.**] *Rev. Brasileira Leprologia.* S. Paulo. 1950, Dec., v. 18, No. 4, 155–76, 15 figs. [16 refs.] English version 168–76.

MARTIN, Betty. **Miracle at Carville.**

This book is reviewed on p. 601.

HELMINTHIASIS

Seiser, A. Verwurmung und landwirtschaftliche Abwasserverwertung. [**Worm Infestation in relation to Land Treatment of Sewage.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, May 25, v. 155, Nos. 5/7, Bericht pp. 299*–307*. [52 refs.]

This paper is based on the extensive literature of the last few years on the extremely high degree of worm infestation in many parts of Germany. It gives the extent of this infestation, describes the general ill-health and possible clinical complications resulting therefrom and sets out the causes of the condition through the extensive use of sewage in the fertilization of the soil in agriculture. Methods of sewage disposal in relation to this infestation are outlined. The steps which should be taken at once and in the future to solve this important problem are set out. *M. E. Delafield*

Li, S. Y. & Hsü, H. F. **On the Frequency Distribution of Parasitic Helminths in their Naturally Infected Hosts.** *J. Parasitology.* 1951, Feb., v. 37, No. 1, 32–41, 23 graphs.

Rodríguez Pavón, A. Parasitosis intestinal en niños menores de tres años. Su terapéutica. [**Intestinal Parasites and their Treatment in Children below the Age of Three Years.**] *Rev. Med. Veracruzana.* 1950, Nov., v. 30, No. 11, 2133–41.

Helminthic parasites only are referred to in this article. The author examined the faeces of 205 children whose ages ranged between 6 months and 3 years and found *Ascaris* in 128 (62·4 per cent.), *Trichuris* in 171 (83·4), hookworms in 29 (14·1) and *Enterobius* in 39 (19·0). The life-histories of the worms are related and their symptomatology. *Ascaris* infestation may be very heavy at an early age ; one case is mentioned of a child of 8 months and 12 days who, after a purge, passed 119 worms and, later, 47 more. Treatment of ascariasis is by a mixture of santonin, chenopodium, calomel and castor oil ; to those over 2 years hexylresorcinol was given in doses of 0·1 gm. for each year of age. For *Trichuris* " *leche de higuerón* " is regarded as specific, but not, as it is often taken, in capsules, but in solution [emulsion], 0·1 gm. per kgm. body-weight, with aluminium hydroxide, preceded the evening before by a mild purgative. Hexylresorcinol was less effective ; later more satisfaction was obtained from preparations of garlic ; this was used at first in powder form as a retention enema (0·25–0·5 gm. per year of age), later orally and rectally at the same time. Finally, arsenicals were tried, but the results varied and the number of cases is as yet too small to enable a decision to be reached. Hookworm disease is due to both *A. duodenale* and *N. americanus*, but mostly (80–90 per cent.) to the latter. If associated with *Ascaris*, hexylresorcinol proved the best treatment. Five of the children were given tetrachlorethylene " 2–3 drops per year of age ", but it caused nausea, vomiting and general weakness. For *Enterobius* infestation, gentian violet, 0·01 gm. for each year of age, during 8 to 10 days, proved satisfactory ; hexylresorcinol was also tried, but was less effective. *H. Harold Scott*

Qazilbash, N. A. **Santonin—its Detection and Estimation.** *J. Pharmacy & Pharmacol.* London. 1951, Feb., v. 3, No. 2, 105–11. [19 refs.]

Ross Institute Industrial Advisory Committee [Wigglesworth, A., Chairman]. London School of Hygiene and Tropical Medicine. Information and Advisory Service. 1951, Feb., No. 6, 16 pp., 3 figs. [15 refs.] **Schistosomiasis or Bilharzial Disease.**

The sixth of the Ross Institute's bulletin deals with the epidemiology, biology and control of schistosomiasis in so far as they concern the type of reader for whom this series is written. The life-cycle of the schistosomes is adequately described in simple language and illustrated by a clear diagram. Diagnosis is discussed and this includes an illustrated description of the miracidiascope [this *Bulletin*, 1948, v. 45, 258] and a note, in an appendix, on the preparation of cercarial antigen taken from a paper by Blair and Ross [this *Bulletin*, 1948, v. 45, 1094], and an account of its use. The newer methods of treatment are briefly described and the rest of the text is concerned with control. This covers prevention of contamination of water, destruction of snails, avoidance of contact with infected water, destruction of infective cercariae and personal protection. Measures are suggested for control of schistosomiasis on estates : these include examination and treatment of residents and recruits, provision, protection and control of safe water supplies, and good sanitation. The need to deal with infected sources of water is stressed in connexion with the risks to employees engaged in engineering construction work. [Some errors have crept into the list of references and the text. It is understood that a *corrigendum* slip is being prepared, but readers will perhaps wish to correct an error on page 7. In the first paragraph the dosages shown as " 0·2, 0·4 and 0·4 ml." and " three doses of 0·4 ml." should read " 2·0, 4·0 and 4·0 ml." and " three doses of 4·0 ml.". The total of 34 ml. shown in the text then becomes correct.] *H. J. O'D. Burke-Gaffney*

Azim, M. A. & Cowper, S. G. **On the Maintenance of Strains of *Schistosoma mansoni, S. haematobium* and *S. matthei* in the Laboratory in Egypt, with special reference to the Use of Gerbils.** *Brit. J. Exper. Path.* 1950, Oct., v. 31, No. 5, 577–89, 5 figs. (2 on pl.). [12 refs.]

In a search for the ideal laboratory animal for maintenance of strains of schistosomes, several animals of different species were exposed to infection with *S. mansoni, S. haematobium* and *S. matthei* by different methods. The methods employed and the results obtained are described in detail. It was found that monkeys were easily infected with *S. mansoni* and *S. matthei* and gave a regular supply of viable eggs. Gerbils were also satisfactory animals but produced scanty eggs in the faeces, while mice had the disadvantages of high mortality rate, low infection rate and scanty eggs : they were also more expensive than gerbils. *S. haematobium* is the most difficult species to rear in animals. In gerbils the yield of adult worms was very small and an infected hedgehog underwent spontaneous cure. Mice could not be infected with *S. haematobium*. *S. matthei* (Rhodesian strain) was successfully introduced into baboons, gerbils, hedgehog and guineapigs. It is concluded monkeys are the most suitable hosts in which to maintain the infection and that of other animals, gerbils have considerable advantages. *J. J. C. Buckley*

Bitschai, J. **Bilharziasis of the Urinary Tract. Some Clinical Aspects.** *J. Internat. College of Surgeons.* 1950, Sept., v. 14, No. 3, 285–93, 14 figs.

Urinary bilharziasis causes an extraordinary variety of pathological conditions, many of which resemble those due to other diseases of the urinary tract. Calcification, dilatation, stricture, kinking, papilloma formation or stone

formation all may be seen in the ureters. Vesical calcification and tumour formation with subsequent malignancy also are common. The prostate and the urethra are frequently involved, and in many cases there are strictures with fistulous urethral openings to the perineum. X-ray photographs illustrate examples of these, and the surgical treatment of some of them is described.
A. R. D. Adams

Belal, A. **Bilharzial Ova in Adenoid Tissue.** *J. Roy. Egyptian Med. Ass.* 1951, v. 34, No. 1, 41–4, 3 figs.

A mass of adenoid tissue, covered with mucus, was found in a 12-year-old boy in Egypt. On removal it was found to contain " Bilharzia ova " in fibrous tissue, with giant cell formation. It was not possible to identify the species of the ova seen in the sections, and no cercariae or adult worms were seen in these. The theories advanced to account for ectopic schistosoma ova are briefly considered.
A. R. D. Adams

Stigliani, R. Interpretação hispatológica da reação tecidual schistosomótica na descrição de algumas raras localizações. (Ovário, trompa, útero, apêndice, mesenterio, gânglio linfático mamário.) Schistosomiase associada a tumores (adenoma retal solitário, teratoma ovárico, epiteliomas do útero, câncer da mama.) [**Histopathology of** *Schistosoma mansoni* **Invasion in Unusual Sites (Ovary, Uterus, Appendix, Mesentery, Mammary Gland). Schistosomiasis and Tumour Formation (Rectal Adenoma, Ovarian Dermoid, Epithelioma of the Uterus and Cancer of the Breast).**] *Arquivos Univ. Bahia Facul. de Med.* 1949, v. 4, 321–403, 39 figs. on 20 pls. [Numerous refs.]

A long article but full of interest for the helminthologist and the pathologist. The title indicates its scope. The author describes infestation of the appendix with ova of *S. mansoni* and indicates that, unless carefully looked for, this is liable to escape observation. Of 15 appendices examined histologically, in three the ova were found and, in places where this form of helminthiasis occurs such examination of extirpated appendices ought always to be made. Other intestinal and intra-abdominal conditions are next considered, again with illustrative cases from the author's personal records, such as polypoid adenoma of the rectum, invasion of the mesenteric glands, of the ovary, the uterus, the Fallopian tubes and associated with an ovarian dermoid cyst ; with carcinoma of a cornu of the uterus and a carcinoma of the breast.

Minute descriptions of the pathological histology are given and after each section a bibliography. The tissue changes are clearly shown in a series of photomicrographs. Apart from those actually recorded in detail, the author refers to other similar cases : 9 with localization in the uterus, 4 in a uterine cornu, 10 in an ovary, one with carcinoma and one with a bilateral dermoid cyst.
H. Harold Scott

Coutinho, J. O. & Coutinho, M. A. Notas sôbre a fixação do complemento com antígeno específico no diagnóstico da esquistossomose mansônica. [**Complement Fixation in the Diagnosis of Schistosomiasis mansoni.**] *Hospital.* Rio de Janeiro. 1950, Oct., v. 38, No. 4, 489–96.

As antigens for these tests the authors used the hepato-pancreas of infected *Australorbis*. Three antigens were tried for comparison : 1. Fairley's antigen. 2. A modification of this, with the use of an extract of the glands dried *in vacuo* and finely powdered. 3. One prepared by taking 150 parasitized glands, drying

and reducing them to a fine powder, adding alcohol 10 parts to one of the powder, placing for 10 days at 37°C., with daily shaking, the filtering and keeping at 10°C.

Seven hundred and twenty-two reactions were carried out with the last on the sera of patients who were passing ova of *S. mansoni* ; 26 (3·6 per cent.) were negative, 696 (96·4) were positive in some degree. These positives are divided into 2-plus, 3-plus and 4-plus, and the respective numbers and percentages were 88 (12·6), 275 (39·5) and 333 (47·8), or 12·6 weakly positive and 87·3 per cent. definitely positive. Seventy-two other sera were used as controls : 25 from syphilitics, 10 from leprosy patients, 10 with Chagas's disease and 27 with helminthic infestations other than schistosomiasis mansoni ; all proved negative.

H. Harold Scott

HUNTER, G. W., DILLAHUNT, J. A., FAUST, E. C., MODIC, J. L., CONNELLAN, J. D., BENNETT, H. J. & INGALLS, J. W., Jr. **The Diagnosis of Schistosomiasis japonica. IV. Studies on Schistosomiasis japonica in an Australian Air Force Unit.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 50–56. [17 refs.]

Large numbers of white adults acquired *Schistosoma japonicum* infections in the Philippines during World War II. These afforded unique opportunities for study of the diagnosis and of the early manifestations of Eastern schistosomiasis. Men of an Australian airfield construction unit were in a highly endemic area for only 18 days ; during this time by bathing in infested waters they afforded themselves every opportunity for becoming infected ; they were then transferred to a schistosome-free area. Four weeks or more after exposure, when the more severe symptoms of schistosomiasis appeared, one of the authors saw them and did differential blood counts and stool examinations by a direct smear, or an egg-hatching, technique. The conditions under which he worked were primitive, and few positive findings resulted. Those men with clinical signs were regarded as " infected ", those with none as " non-infected " ; the former were treated with fouadin for 14 days some 3 to 4 months after exposure to infection ; the latter were left untreated.

Six months after the period of exposure, 42 men from the " infected " group, *i.e.*, already treated, and 40 from the " non-infected " group were selected at random and carefully re-studied. In addition to a number of methods of search for eggs, including a hatching technique, rectal biopsies were done on 44 of these men. Proctoscopic biopsy in 5 cases yielded eggs from cases from which none could be obtained from the stools ; it therefore proved to be a valuable aid in the diagnosis of Eastern schistosomiasis. Of the 42 men in the " infected " group only 14 consistently failed to yield ova ; of the 40 in the " non-infected " group 13. In neither group were there clearly defined clinical symptoms or signs ; but anorexia, weakness, and nuchal myalgia were more common in the " infected " than in the " non-infected " group. This probably was due to the fact that the latter had lighter infestations than the former. Fouadin proved unsatisfactory in ensuring sterilization in many cases, particularly of the " infected ", and previously treated, group. It is suggested that the temporary disappearance of ova immediately after treatment is due to temporary damage to the reproductive organs of the adult worms by antimony treatment.

A. R. D. Adams

SALIS, H. & SMITH, W. C. **Cerebral Schistosomiasis : Report of Case with Medical Management.** *Ann. Intern. Med.* 1951, Jan., v. 34, No. 1, 238–43. [Bibliography.]

" 1. A case of latent, or chronic, schistosomiasis japonica, with cerebral involvement, is reported.

"2. The diagnosis was established by a history of exposure to the disease, a symptom complex including Jacksonian convulsions, a positive skin test to cercarial antigen, a low-grade eosinophilia, abnormal electroencephalograms, and psychometric evidence of mental deterioration.

"3. Confirmation of the diagnosis was furnished by a cessation of symptoms with therapy, a subsequent return to normal of the skin test and electroencephalogram, and by marked mental improvement as evidenced by psychometric examination.

"4. Therapy consisted of a sterile 0·5 per cent. solution of potassium and antimony tartrate injected intravenously, with a total dosage of 444 c.c. or 2·22 gm.

"5. Reactions to the drug therapy consisted of a marked local phlebitis, occasional immediate cough, an episode of nausea, vomiting and diarrhea one hour after injection, appearance of a pruritic erythema, and a metallic taste following the final three injections. There were also temporary changes in the T waves of the electrocardiogram.

"6. Medical diagnosis and therapy have resulted in complete recovery in a case of cerebral schistosomiasis."

LAGRANGE, E. & SCHEECQMANS, G. Recherches expérimentales sur l'infestation à *Bilharzia mansoni* de la souris. [**Experimental Studies on** *S. mansoni* **Infections in Mice.**] *C. R. Soc. Biol.* 1950, Oct., v. 144, Nos. 19/20, 1422–4.

In view of the difficulties inherent in experimental chemotherapy with mice infected with schistosomes, the possibility of testing substances against the larval stages, miracidia and cercariae, was considered. Derivatives of antimony, even in concentrated solutions, were found to have no action on cercariae, but Miracil D, 1 part in 10,000, killed them immediately, while a solution of 1 part in 10 millions (actually, 1 in 20 millions) was also effective but slower in action. Of other substances tested against cercariae, only oxazines, especially Meldola Blue and Nile Blue sulphate, gave results of any interest. Miracil D and Nile Blue sulphate were also found to be very toxic to miracidia of *S. mansoni* and *F. hepatica*. It is pointed out, however, that the action of these substances against the larval stages is no measure of their curative value in *in vivo* infections, for Nile Blue has no effect on schistosomiasis in mice and Miracil D has none in experiment fascioliasis. *J. J. C. Buckley*

WATTS, N. P. & MCCONNELL, K. P. **Effect of Polonium^{210} and Selenium^{75} in Experimental** *Schistosoma mansoni* **Infection in Mice.** *Amer. J. Hyg.* 1951, Jan., v. 53, No. 1, 11–16. [17 refs.]

"Neither alpha nor gamma radiation, as supplied by polonium^{210} and selenium^{75} in this experiment, have been observed to be damaging to the worm form of *Schistosoma mansoni* in the experimental infection in mice."

DESCHIENS, R. & POIRIER, M. L'intoxication expérimentale du cobaye par l'extrait de *Fasciola hepatica*. [**Experimental Intoxication of Guineapigs by** *F. hepatica* **Extract.**] *C. R. Soc. Biol.* 1950, Oct., v. 144, Nos. 19/20, 1345–6.

Inoculation of 7 guineapigs with trichloracetic acid extract of *Fasciola hepatica* was carried out daily for 9 to 33 days, and on the 33rd day 5 of them were killed and examined, having each received a total of 32 cmm. per kgm. of the extract, or the equivalent of 16 gm. of worms. Two of the animals had died on the 9th and 10th days. Clinically there was progressive loss of weight and asthmatic dyspnoea during the course of the inoculations. In the blood

there was an increase of the polymorphonuclear leucocytes of 30 to 60 per cent. while the eosinophilia also increased. The bone marrow exhibited a constantly high eosinophilia. The haemoglobin index was reduced from 70 to 50 per cent. Lesions comparable with those resulting from inoculation with extracts of *Ascaris megalocephala* and *A. lumbricoides* [this *Bulletin*, 1949, v. 46, 851] were noted in the lungs, kidneys, liver and spleen.

It is worthy of note that of all the helminth extracts studied by the authors, that of *F. hepatica* is the only one which caused a relatively important and constant eosinophilia in the blood. *J. J. C. Buckley*

Batte, E. G., Swanson, L. E. & Murphy, J. B. **Control of Fresh Water Snails (Intermediate Hosts of Liver Flukes) in Florida.** *J. Amer. Vet. Med. Ass.* 1951, Mar., v. 118, No. 888, 139–41, 2 figs.

"Fluke control in Florida is dependent upon dosing the host animal with hexachloroethane to kill the adult flukes in the bile ducts, and eradicating the snails which serve as intermediate hosts. Snail eradication may be accomplished by destroying their breeding areas and by application of copper sulfate."

Huhtala, A. Ueber die Verbreitung des breiten und des schmalen Bandwurms in Finnland. [**The Distribution of Broad and Narrow Tapeworms in Finland.**] *Ann. Med. Intern. Fenniae.* Helsinki. 1950, v. 39, Suppl. 6, 63 pp., 10 maps & 1 fig. [63 refs.]

This monograph, which is illustrated with numerous maps and drawings, describes the distribution of *Diphyllobothrium latum*, *Taenia solium* and *Taenia saginata* in Finland, the proportion of the human population infected with each species, and the various animal hosts locally involved in their different life-cycles. The author estimates that no less than 20 per cent. of the entire population of Finland harbour the adult stage of *D. latum*, and he devotes some 50 of the 60 pages of his memoir to an account of this important parasite. Short descriptions of the, locally, much less important parasites—*T. solium* and *T. saginata*—are given in the remaining ten pages. This memoir, although it contains very little original work, provides an up-to-date and valuable review of the literature concerning *D. latum* infections as observed in Finland, a country where this parasite and the pathogenic effects it sometimes causes have been studied continuously for many years. *R. M. Gordon*

Rudat, K. D. Ein kasuistischer Beitrag über das Vorkommen mehrerer Fischbandwürmer beim Menschen. [**Multiple Infection with *Diphyllobothrium latum* in a Human Being.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1951, Jan., v. 2, No. 3, 410–12.

The English summary appended to the paper is as follows :—

"The author reports a remarkable case of bothriocephalus infection in a man, 52 years of age, returned from the Baltic region. Treatment with a helminthagogic called "Mapha" (extractum filicis compound) yielded five full-grown specimens of Dibothriocephalus latus measuring 27 to 36 feet in length. The general condition of the patient was practically unimpaired ; his blood status showed neither anaemia nor eosinophilia."

Tucker, H. A. **Hydatid Disease at the Los Angeles County Hospital, 1936–1948 ; with a Report of First Autochthonous Case from California.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 83–9, 2 figs. [10 refs.]

"One pulmonary and five hepatic echinococcus (hydatid) cysts were diagnosed and treated at the Los Angeles County General Hospital during the

twelve-year period 1936–1948. One patient, a 14 year old California-born Japanese school-boy, reported in detail, is believed to represent the first autochthonous case from California."

Matilla, V., Aparicio Garrido, J. & Prieto Lorenzo, A. Estudios sobre anquilostomiasis. II. Aportación a la clinica de la enfermedad. [**Ankylostomiasis—Clinical Features.**] *Med. Colonial.* Madrid. 1951, Feb. 1, v. 17, No. 2, 117–51, 3 figs. [69 refs.]

In a previous paper the authors referred to a focus of infestation in Madrid [see this *Bulletin*, 1950, v. 47, 767]. They now give an account of the clinical features of ankylostomiasis with references here and there to 102 cases, but mostly based on the records of others. They mention all the symptoms noted in textbooks—cutaneous, gastro-intestinal, nervous, cardio-vascular, respiratory, haematological and the rest—stating under some of them the proportions presenting these symptoms among their few cases. Readers of this *Bulletin* and all students of tropical medicine are fully aware of these, but one special point to which the authors draw attention may be stressed ; that is the history of prolonged gastric disturbance, emaciation, anaemia and general asthenia may lead to an erroneous diagnosis of carcinoma of the stomach, and a case is detailed in which, after minute clinical examination and examination of the blood, stomach contents and gastric juice, occult blood, Takata Ara test [but, strangely, no faecal examination is mentioned] the diagnosis of early pyloric neoplasm was made. The condition cleared up and many hookworms were expelled, on treatment by tetrachlorethylene and later improvement followed administration of liver extracts, iron and vitamins.

H. Harold Scott

Legler, F. Zur Frage der Infiltrationsweite von Ascarideneiern im Erdboden bei Abwasserversickerung. [**The Penetration into the Soil of *Ascaris* Eggs during the Disposal of Sewage on Land.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, May 25, v. 155, Nos. 5/7, Bericht pp. 294*–9*. [12 refs.]

The considerable helminthic infestation of the population in parts of Germany since the War has drawn attention to the question which is the subject of this paper. Numerous experiments were made to determine the actual numbers of *Ascaris* eggs filtered off by humus and by sand, from sewage liquids containing known numbers of these eggs. The method adopted for enumerating the eggs was to filter a known volume of sewage liquid through a membrane filter, then to examine the filter and count the number of eggs in a certain number of microscopic fields.

The more important experimental results were :—

(1) A layer of humus, 2·5 cm. in thickness was an efficient filter. Of 30,000 eggs contained in 1,250 cc. of liquid, only 16 permeated the humus.

(2) When the humus layer was 6·0 cc. thick, no eggs were seen in the filtrate.

(3) Unsifted natural fine sand in a layer of 3 cm. depth, was impermeable to the eggs.

(4) Sands of particle size of 1 to 2 mm. and also sands of 2 to 3 mm., were not effective filtering agents even when used in a depth of 6·0 cm.

M. E. Delafield

Reitano, U. & Fondacaro, A. Sindrome di Schönlein-Henoch da ascaridi. [**Henoch's Purpura due to Ascaris.**] *Acta Med. Italica.* 1950, Nov., v. 5, No. 11, 388–92. [54 refs.] English summary (7 lines).

During his stay in hospital, from April 8th to June 20th, a boy of 10 with Henoch's purpura was treated with salicylates, vitamins and calcium chloride

both by mouth and intravenously, anti-histamine drugs, sulphonamide drugs and penicillin—all with little or no effect on either the haemorrhages or the abdominal and joint symptoms. Ten attacks in all occurred in hospital. Eventually, some roundworms were passed in the stool, *Ascaris* eggs were demonstrated, anthelminthic treatment was given and the attacks of purpura came to an end. A week later, the body fluid from worms which the patient had passed was inoculated into his skin and this produced both a local reaction (an itchy weal with surrounding redness) and a fresh attack of purpura. The skin test was repeated 3 days later with similar results. A further course of anthelmintic treatment resulted in complete recovery. With the Praussnitz-Küstner techinque the local skin reactivity to *Ascaris* coelomic fluid was transferred to two other persons in whom there was no evidence or history of helmintic infestation or other gastro-intestinal trouble. *J. Cauchi*

Asenjo, C. F., Colón, J. E. & Hernández-Morales, F. **Studies on Chyluric Urines.** *Puerto Rico J. Pub. Health & Trop. Med.* 1950, Sept., v. 26, No. 1, 55–68. [Refs. in footnotes.] [Spanish version 69–84.]

"1. Observations made in the urine of four cases of chyluria indicated that the daily elimination of fat varied greatly from case to case.

"2. Within the same cases, there were significant variations in the elimination of fat from day to day. However, if observations were performed over long periods of time it was possible to detect a direct relationship between the amount of ingested fat and the amount of excreted fat in the urine.

"3. The urinary fat was composed principally of free fatty acids and neutral fats. Soap fats and unsaponifiable matter composed less than 14 percent of the fat passed in the urine.

"4. The physical and chemical characteristics of the urinary fat were found to be within the range of those of the average dietary fat.

"5. When mineral oil was given orally to chyluric patients, in the form of a U.S.P. emulsion, the same was not passed in the urine.

Pick, F. La compression des veines due à une invagination intestinale comme mécanisme d'enrichissement de microfilaires chez un *Papio sphinx*. [**Compression of Veins from an Intestinal Invagination as a Factor of Increasing the Number of Microfilariae found in a** *P. sphinx*.] *Bull. Soc. Path. Exot.* 1951, v. 44, Nos. 1/2, 57–8.

Kershaw, W. E. **Studies on the Epidemiology of Filariasis in West Africa, with special reference to the British Cameroons and the Niger Delta. I. Methods of Survey for Infections with** *Loa loa* **and** *Acanthocheilonema perstans*. *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 361–78, 1 fig. [25 refs.]

At present knowledge of the vectors which transmit the filariae infecting man in West Africa is limited. Though the species of *Simulium* which transmit *Onchocerca volvulus* have been identified in many areas, some of the stages in the life-history of the *S. neavei* group have only recently been described [this *Bulletin*, 1951, v. 48, 181], but the breeding places of *Chrysops silacea* and *C. dimidiata*, the vectors of *L. loa*, were identified only two years ago [*ibid.*, 1949, v. 46, 563]. We know little of the life-history and habits of these flies. The identity of the vector of *Acanthocheilonema perstans* is still undecided. There is little information on the epidemiology of any of these infections with the exception of onchocerciasis.

L. loa infection may be diagnosed by : (1) the identification of the microfilariae in the peripheral circulation ; (2) the removal and identification of

the worm at operation ; (3) a history of the worm crossing the eye, or the occurrence of Calabar swellings ; (4) serological reactions. A history of Calabar swellings or of worms crossing the eye can only be accepted with confidence in Europeans. Diagnosis by serological means is at present unsatisfactory. The antigen must be so specific as to enable *L. loa* infections to be distinguished from those due to other filariae which occur in the same area.

An anomalous feature is that incidence of *L. loa* in a hyperendemic area (Kumba-British Cameroons) is less than might be expected from repeated exposure of the population to infective bites of *Chrysops*. The incidence varies from 16 to 23 per cent., though during the height of the *Chrysops* season the risk of infection with *L. loa* is estimated at once every five days. The host-parasite relationship of filariasis in the cotton rat has features in common with *L. loa* infections in man. In low-grade infections in which few adult female worms are present it is possible that no microfilariae may be found in the blood. Nevertheless, in Kumba, where the infection-rate in the fly is high, low-grade infections would be expected to be the exception rather than the rule.

For field surveys of the incidence of infections with *L. loa* and *A. perstans* in man films were made from 50 cmm. of blood taken up in special pipettes. This amount is the maximum volume which can conveniently be taken from the finger. After dehaemoglobinization the slides were dried, fixed in spirit and stained in hot Mayer's haemalum for 3–5 minutes, and washed in water for an hour. The microfilariae of each species were then counted. In a comparison between stained thick films and wet preparations it was found that the former not only made for readier diagnosis, but enabled even a single microfilaria to be found and identified.

The effect of periodicity on the results of blood examination was investigated by examining nine subjects at hourly intervals for 36 hours. The curves of the counts of microfilariae of *L. loa* from all individuals have the same shape, though there are considerable variations in their amplitude, while the rise and fall coincide very nearly with dawn and dusk. The rise begins at almost the same time in the morning, the microfilariae are present in their maximal numbers for five or six hours about noon, and the fall occurs at the same time during the evening. In those with high and moderate counts microfilariae of *L. loa* were present in considerable quantities during the hours of daylight and in high concentrations between 8 or 9 a.m. until 3 or 4 p.m. The curves have relatively flat tops during the four hours about noon, unlike the sharply rising and falling curves of infections with *W. bancrofti*.

The volume of blood taken up by one *Chrysops* feeding to repletion has been estimated as varying between 10 and 20 cmm. Therefore one *Chrysops* has abundant opportunity of taking up microfilariae during daylight hours. That the flies make good use of this opportunity is shown by the almost exact synchronism between the biting habits of the fly and the appearance of microfilariae in the peripheral circulation. The curves derived from counts of *A. perstans* show little tendency to periodicity. By analogy with results in filariasis of the cotton rat it was thought that there might be low-grade infections with *L. loa* in which the number of microfilariae might only just be sufficient for their intermittent appearance in the peripheral blood. Results of examination of two groups of prisoners showed that microfilariae were constantly present in the majority and intermittently present in the minority.

It seems likely in a village community living under orderly conditions, where very heavy superinfection is likely to occur and where the habits of all those exposed to infection are the same, that repeated examinations are less likely to show a markedly increased infection rate with *L. loa* than in a community which has been collected from different areas in which the risk of infection varies.

Repeated examinations of the prisoners in Kumba gaol showed that for practical purposes a volume of 50 cmm. is a convenient maximum volume and it was considered that, if such an amount could be shown to be adequate, such methods as KNOTT's [this *Bulletin*, 1940, v. 37, 304], which involve taking larger quantities from a vein, could be dispensed with. The amount was adequate for embryos of *L. loa* and *A. perstans*.

To ascertain the accuracy of counts of the microfilariae in the peripheral circulation persons were chosen with large numbers of microfilariae in the peripheral blood, and five films, each of 50 cmm., were made and compared with an equal number taken with a syringe from each antecubital vein. It became evident that counts of the microfilariae in the successive samples taken from each finger-prick are in fairly close agreement with each other, but that those from the veins are similarly related, though the counts are somewhat lower. Counts made from a finger-prick can thus be taken as representative of the number of microfilariae in the peripheral circulation. It is concluded that, so far as the numbers of microfilariae of *L. loa* and *A. perstans* in the peripheral circulation are concerned, a single examination of 50 cmm. is representative, and it is possible that in homogeneous populations a single examination will disclose most of those harbouring microfilariae in the peripheral circulation ; in heterogeneous communities a single examination should reveal about two-thirds of those with microfilariae in the blood.

These results are compared with those of other authors on *W. bancrofti* infections, for instance those of the reviewer in Fiji. The variations are not unduly wide and give a mean coefficient variation ranging from 0·19 to 0·33. These variations are a little larger than those obtained by the author in the present study with either *L. loa* or *A. perstans*. He found, on the whole, that blood taken at noon from the thumb has a higher count than that taken from the corresponding vein. *P. Manson-Bahr*

BURCH, T. A. Observaciones referentes al tratamiento de la oncocercosis con Suramina y Hetrazan. [**On the Treatment of Onchocerciasis with Suramin and Hetrazan.**] Reprinted from *Rev. Salubridad y Asistencia*. Guatemala. 1950, Apr., v. 3, No. 4, 11 pp. [11 refs.]

[A previous paper on this subject by the author was abstracted in 1949 [this *Bulletin*, v. 46, 855]. The present is as full of interest as the former. Moreover, it is an excellent illustration that the old adage " Well begun is half done " may be deceptive.] During 1949 among 37,260 persons examined in Guatemala, 5,528 suffering from onchocerciasis and presenting nodules were treated by extirpation of the nodules. The author has now tried suramin in some patients and hetrazan in others, in Yepocapa, an endemic zone of the infection in Guatemala and has compared their effects. Altogether 82 patients were treated ; others who did not undergo at least half the course are not included. Except a few who reacted too strongly they all remained at work on the coffee plantations. Forty-seven were given suramin intravenously, the whole course being 8 injections of 1 gm. weekly ; 28 had six injections or more, to a total of 0·14 to 0·31 gm. per kgm., the other nineteen had at least four injections. Thirty-five were given hetrazan, in doses of 0·25 to 2·0 mgm. per kgm. body weight, 3 times a day for 3 to 6 weeks " with a total dose of 10 to 160 mgm. per kilogramme." This would be the complete course ; 20 received at least 40 mgm. per kgm.

Examination for microfilariae showed that all who had received 40 mgm. or more hetrazan per kgm. were negative at the end of the treatment, as compared with 14 of 26 who received 0·14 gm. or more of suramin [earlier it is stated that 28 had received this amount], but at the end of a year only 3 of 20 who had

had the hetrazan treatment did not show microfilariae, but no adult parasites were found in 21 of the 24 treated with suramin, from whom skin sections were taken for histological examination.

As regards by-effects, 4 of the 47 receiving suramin had rise of temperature after one of the first three injections and lasting 1–3 hours ; 8 had fever after later injections when it might last for a week. Thirteen of the 35 patients treated with hetrazan had fever lasting for one to seven days. Burning sensations in palms and soles were often complained of by those receiving suramin.

To epitomize : The disappearance of the microfilariae might be astonishingly rapid after either drug, " spectacular " after hetrazan, but more than half of those receiving 0·14 gm. of suramin per kgm. still showed the embryos ; after a year, however, only 15 per cent. of those treated with hetrazan were free from microfilariae, whereas 87 per cent. of the suramin-treated patients were free. This would indicate a possible advantage of combining the rapidly acting hetrazan with the slower but more permanently efficacious suramin, as the latter kills the adult worms also.

The author recommends the following plan of treatment with suramin as being the more permanently effective. Injection of a freshly prepared 10 per cent. solution of suramin intravenously in a series of 8 injections starting with 0·5 gm. and thereafter 1·0 gm. weekly, for an Indian adult of 50 kgm. ; for others the dosage should be proportional to weight. *H. Harold Scott*

SCHMIDT, J. & MENDHEIM, H., with J. HANNAK. Epidemiologische Untersuchungen ueber die Verbreitung von Wurmeiern in Erziehungsanstalten. [**Epidemiological Investigations of the Distribution of Worm Eggs in Educational Institutions.**] *Zent. f. Bakt.* I. Abt. Orig. 1950, Oct. 16, v. 156, No. 2, 156–60. [35 refs.]

This paper begins with an account of many of the known facts about *Enterobius* and states the importance of the inhalation of egg-containing dusts in the spread of the infestation.

The experimental part compares the efficiency of various methods of collecting the dust. The authors devote most attention to the method in which " cellophane " adhesive strips are pressed on to the dusty surface which is to be examined. This strip is then placed on a microscopic slide with the addition of some castor oil, and examined directly for worm eggs. This method is found to be effective except on surfaces on which there is a gritty dust. For such surfaces the method whereby the dust is collected by means of a damp brush taken up in water, filtered, centrifugalized, the deposit then mixed with salt solution and examined microscopically, is the best to employ. The results of the examination of various institutions are given—eggs of *Enterobius* were found in many places in fair quantity—on the seat and floor of closets, on doors and floors and walls of class-rooms. *M. E. Delafield*

BERGE, C. L'oxyurose erratique. (A propos d'un cas d'oxyure enkysté dans le meso-appendice). [**Erratic Enterobiasis.**] *J. Méd. de Bordeaux.* 1951, Feb., v. 128, No. 2, 323–5, 2 figs.

The following is a translation of the author's summary :—

A case is reported of *Enterobius* encysted in the meso-appendix, forming a fairly large nodule discovered at operation which had been indicated because of clinical signs of acute appendicitis. *H. J. O'D. Burke-Gaffney*

KEIZER, D. P. R. **Secondary Effects of Phenothiazine.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1950, June, v. 2, No. 2, 178–81. [13 refs.]

Two cases are reported in which there were toxic effects following phenothiazine administration.

A two-year-old girl was given 9 grammes of phenothiazine. [It is not stated how the dose was divided but one must assume that it was.] She became ill and the phenothiazine was stopped, but three days later she was still showing increasing pallor. The blood showed anaemia (38 per cent. haemoglobin and 1·4 million red cells per cmm.), a leucocytosis (18,000 per cmm.) and a reticulocytosis (24 per cent.). The urine contained a trace of albumin, much urobilin, erythrocytes in the sediment, but no haemoglobin. The thionol reaction in the urine was positive for seven days and in the stools for nine days after cessation of administration of this drug.

After 200 ml. of transfused blood, and iron and liver in large doses, the child recovered (haemoglobin 91 per cent.) and was discharged after fourteen days in hospital.

A boy of five years was given 6 grammes of phenothiazine, for enterobiasis, in divided doses over four days. The child complained of nausea and anorexia. He became slightly icteric and pale. The urine was dark and contained an excess of urobilin and urobilinogen, albumin and red blood cells, but no bile salts or haemoglobin.

The blood count was haemoglobin 36 per cent., erythrocytes 1·9 millions, leucocytes 23,000 and platelets 7,000 per cmm. The average diameter of the erythrocytes was 8·2μ, there were 25 per cent. of reticulocytes ; there were many normoblasts, erythroblasts, cells with Howell-Jolly bodies and Heinz bodies, and target-cells. The van den Bergh reaction was positive ; the serum bilirubin was 1·08 units. Sternal puncture showed highly vascular tissue with erythropoietic preponderance.

Treatment consisted of blood transfusion (350 ml.), iron and liver. The patient was discharged in ten days with 80 per cent. haemoglobin. The red cells were still large (8·2μ) and the Takata-Ara test was positive. A fortnight later this test was negative and the mean red-cell size was reduced to 7·2μ.

The author considers that phenothiazine should be given for one day only in a dosage of 120 to 150 mgm. per kgm. body-weight provided there are no signs of anaemia, hepatitis or nephritis. *L. E. Napier*

DEFICIENCY DISEASES

EGIDIO, L. Note ed osservazioni sulle abitudini alimentari dei Somali e rilievi circa le ripercussioni sul loro stato di salute dell'attuale sistema di alimentazione. [**The Food of the Somali and its Effect on his Health.**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1950, Nov., v. 31, No. 11, 840–50. English summary (6 lines).

Egidio writes from the experience and observations of over 17 years' resident service in Italian Somaliland working for a plantation which has developed the native settlement of Villaggio Duca degli Abruzzi on the middle reaches of the Scebeli river. He gives an account of the diet of various groups—the nomads, the semi-nomads who do some farming as well as herding, the farmers and the more urbanized people. The nomad may drink as much as nine litres of milk in a day, either fresh or sour : he also makes butter, eats some raw wild fruit

and vegetables during one or two months in the year and he may consume some meat on ceremonial occasions ; he gets about 2,600–3,000 calories a day but often shows signs of iron deficiency. The account of the diet of the other three groups shows a gradual approach to the composition of the diets of temperate climates ; the calorie equivalents are 3,000–4,000. Most Somalis are habitually improvident and seasonal famines are not infrequent. [Egidio's experience can be duplicated by that of many medical officers who have worked among other undeveloped African communities.] *J. Cauchi*

Portères, R. *Eleusine coracana* Gaertner, céréale des humanités pauvres des pays tropicaux. [*E. coracana*, **Gaertner, a Cereal used by Impoverished Peoples in Tropical Countries.**] *Bull. Inst. Français d'Afrique Noire.* 1951, Jan., v. 13, No. 1, 1–78, 11 figs. & 1 folding map. [Numerous refs.]

HAEMATOLOGY

Dagradi, A. E., Sollod, N. & Friedlander, J. H. **Mediterranean Anemia, Report of Case in an American Negro.** *J. Amer. Med. Ass.* 1951, Feb. 3, v. 145. No. 5, 317–18. [Refs. in footnotes.]

Wright, C. S., Dodd, M. C., Bouroncle, Bertha A., Doan, C. A. & Zollinger, R. M. **Studies of Hemagglutinins in Hereditary Spherocytosis and in Acquired Hemolytic Anemia ; their Relationship to the Hypersplenic Mechanism.** *J. Lab. & Clin. Med.* 1951, Feb., v. 37, No. 2, 165–81, 7 figs. [48 refs.]

Margolies, M. P. **The Incidence of Sickling.** *Amer. J. Med. Sci.* 1951, Mar., v. 221, No. 3, 270–72. [39 refs.]

" 1. Sickling tests done on 1,000 Negro in-patients and out-patients at the Graduate Hospital of the University of Pennsylvania revealed an incidence of 7·2%.

" 2. A review of all the available reported studies on the incidence of erythrocyte sickling reveals an incidence of 7·25% in the United States, 9·35% in Central and South America, and 11·1% in Africa, resulting in a world incidence of 9·01%.

" 3. The less frequent occurrence of sickling in the United States as compared with Central and South America and Africa may be attributed to the less pure strain of Negro blood found in this country."

Wells, I. C. & Itano, H. A. **Ratio of Sickle-Cell Anemia Hemoglobin to Normal Hemoglobin in Sicklemics.** *J. Biol. Chem.* 1951, Jan., v. 188, No. 1, 65–74, 3 figs. [17 refs.]

" The ratio of sickle-cell anemia hemoglobin to normal hemoglobin has been determined in forty-two sicklemic individuals who were otherwise normal and genetically unrelated. In this series of individuals the SCA hemoglobin varied from about 24 to 45 per cent.

" Of the several factors tested, *i.e.*, time, age, sex, some environmental factors, and heredity, the latter is the only one not excluded as having an appreciable influence on the ratio of the two hemoglobins which occurs in a sicklemic person.

"The discovery of some anomalous cases of sickle-cell anemia is reported. In contrast to the true sickle-cell anemic, these individuals are able to produce small amounts of normal hemoglobin."

MICKLER, E. E., Jr. & DIGGS, L. W. **The Detection of the Sickle Cell Trait. A Comparison of the Sealed Moist Preparation using Capillary Blood collected during Venous Stasis and the Sodium Bisulfite Method.** *Amer. J. Clin. Path.* 1950, Sept., v. 20, No. 9, 861–4. [10 refs.]

PATEL, J. C. & VARDE, A. P. **Clinical Trials of Indian Manufactured Liver Extract.** *Indian J. Med. Sci.* 1950, Sept., v. 4, No. 9, 381–92.

Six cases of tropical macrocytic anaemia had been treated with crude liver extract (T.C.F.) supplied by the King Edward Memorial Hospital, Bombay. In three, crude liver extract was given in the first period of observation; one patient absconded and in the other two, liver extract (Plexan "Glaxo") was administered in the second period of observation. In the second series of 3 patients the order was reversed. Brands like Chemilon and Plexan were administered during the first period while liver extract (T.C.F.) was given during the second period. From these trials it seemed that T.C.F. was less effective than the other two. *P. Manson-Bahr*

VENOMS AND ANTIVENENES

BENN, K. M. **A Further Case of Snake Bite by a Taipan ending Fatally.** *Med. J. Australia.* 1951, Jan. 27, v. 1, No. 4, 147–9.

The venom of *Oxyuranus scutellaris*, the taipan, is predominantly neurotoxic and very similar to that of *Notechis scutatus*, the tiger snake. A man, 20 years of age, caught one of these snakes and was taking it to be identified when he let it fall. It struck at his boot, his trouser cuff and finally his left hand at the thenar eminence. A tourniquet was applied half an hour later and was removed for 10 seconds every 10 minutes during the next hour and three-quarters. Tiger snake antivenene, 4,500 units, was administered intravenously. Neurotoxic signs came on 5 hours after the biting—blurred vision, vomiting, severe headache, ptosis, weakness of masseters, later strabismus, sterno-mastoid weakness and intercostal paralysis. Another 3,000 units of the antivenene were given intramuscularly, but the paralytic symptoms progressed to involve the face and limbs, and 4,500 more units were injected intramuscularly together with cardiac stimulants, but death occurred 27 hours after infliction of the bite. Judging by the late onset of the nervous symptoms and the absence of convulsions it is probable that the amount of venom actually injected was small (much had probably been spent on the boot and trousers of the patient) and the symptoms were those of a flaccid paralysis and bulbar involvement.

H. Harold Scott

WERLE, E., KEHL, R. & KOEBKE, K. Über die Freilegung von Bradykinin und Kallidin aus Immunserum. [**The Release of Bradykinin and Kallidin from Immune Serum.**] *Biochem. Ztschr.* 1951, Feb. 5, v. 321, No. 4, 348–53, 4 figs.

This work was carried out with the venom of a number of species of snakes [see also this *Bulletin*, 1944, v. 46, 866].

DERMATOLOGY AND FUNGUS DISEASES

MARPLES, M. J. **The Incidence of certain Skin Diseases in Western Samoa : a Preliminary Survey.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Dec., v. 44, No. 3, 319–32, 1 graph. [11 refs.]

The author was the member of a research team investigating health conditions in Western Samoa. In all, 2,070 children were examined ; in 1,329 of these, age, sex, height and weight were also recorded. In addition to 2,042 village children, 105 secondary schoolboys and 124 adults were also examined.

Active yaws was found in 630 village children and 30 adults, but only in 4 secondary schoolboys ; the low incidence among the last group was probably due to treatment. Yaws was rare in infants of a year and under. The commonest site was the soles (86·7 per cent. of all affected children). The percentage infection increased with the age.

Scabies was found in 460 village children and impetigo in 473. These two infections were at their maxima, 36 and 45 per cent., in children of 1 to 2 years and decreased with age.

Tinea versicolor was common (213 cases) and also other ringworms (121 cases). The latter were not identified accurately but were *Trichophyton* infections. Tinea capitis was not found. Prickly heat was observed in infants. Cuts and abrasions were said to be common, especially on the feet, but the tables record only 92 cases of infected wounds among the village children. It is suggested that these as well as the impetiginous lesions and possibly scabies provide the portal of entry for yaws.

The Samoan infants at two weeks are heavier than New Zealand infants and the male infants maintain this advantage up to the age of 6 months, but thereafter New Zealand infants are heavier. *L. E. Napier*

PANJA, D., GUPTA, J. C. & BANERJI, A. K. **Aureomycin in the Treatment of Pemphigus Foliaceus. A Case Report.** *Indian Med. Gaz.* 1950, Nov., v. 85, No. 11, 503–4, 4 figs. on pl.

The patient, a man of 56 years, came to hospital with a serious condition of generalized pemphigus foliaceus and oedema, a temperature of 103°F., pulse 120 per minute and respirations 28 ; there was much itching preventing sleep, but little pain. It had started 3 months before and he had had treatment with arsenicals and penicillin, but without benefit. In hospital he was given " Condy's and Bran baths ", application of calamine and boric acid ointment and unguentum hydrarg. ammoniatum and, internally, salicylates, vitamins C and K and sulphonamide drugs, but there was no improvement. Aureomycin in doses of 250 mgm. five times daily was started. Improvement was noticeable in 4 days and marked in 10 days and in 3 weeks the patient was up and practically well. Stopping of the aureomycin was followed by reappearance of a few fresh blisters, but aureomycin, 250 mgm., thrice daily cleared them up in two days. The authors wisely and cautiously remark that spontaneous remissions are known to occur in this disease and that, therefore, cure is not claimed until the patient has been kept under observation for some time longer. *H. Harold Scott*

CARLOS RADICE, J. & KAPLAN, S. Miasis humana. Estudio histopatológico. [**Human Myiasis. Histopathology.**] *Prensa Méd. Argentina.* 1950, Sept. 22, v. 37, No. 38, 2259–63, 9 figs. & 1 diagram.

Much has been written on human cutaneous myiasis, the general appearance, the insect involved and the treatment, but little on the minute tissue changes

set up. This defect the authors have remedied by their present detailed description of the histological appearances in stained sections of the skin. The description is very detailed ; briefly, the insect by its secretions causes lipoid and necrotic changes in the tissue elements, collagen fibrils, fat cells, etc., while the tissue reacts by attempting to enclose it and limit its action by the usual processes of inflammation. The larva of *Cochliomyia hominivorax* is well reproduced but the photomicrographs of the actual histological changes do not convey much information. *H. Harold Scott*

MACKINNON, J. E., ARTAGAVEYTIA-ALLENDE, R. C., VINELLI, H., NIÑO, F. L., FERRADA-URZÚA, L. V., ALONSO, G. & DONOSO, R. Investigaciones sobre la sensibilización a la coccidioidina y su significado en varias zonas de los países meridionales de América del Sur. [**Investigation on Sensitivity to Coccidioidin and its Significance in various Zones of the Southern Countries of South America.**] *An Facul. de Med. Montevideo.* 1950, Aug., v. 35, No. 8, 1117–37. [43 refs.] English summary.

Surveys of the probable distribution of coccidioidomycosis, based on the coccidioidin dermal sensitivity test, have been made in Argentina by NEGRONI *et al.* [this *Bulletin*, 1949, v. 40, 167, 1175] and in Paraguay by GINÉS *et al.* [*ibid.*, 1950, v. 47, 400] and GÓMEZ [*ibid.*, 1950, v. 47, 1124]. The results of these surveys indicated the probable existence of endemic foci of coccidioidomycosis in the hot, arid steppe region between the Rio Colorado and the Rio Negro in Argentina and in the central zone of the Paraguayan Chaco near the south-western border of Bolivia.

The present report embraces the results of surveys in Uruguay, Argentina and Chile. In view of the demonstration by SMITH *et al.* [this *Bulletin*, 1949, v. 46, 1172] of non-specific reactions to the coccidioidin test in persons highly sensitive to histoplasmin, it was decided to employ both the histoplasmin and coccidioidin tests on the same subject, for the better interpretation of the latter reaction. Guineapigs infected with either *Coccidioides immitis* or *Histoplasma capsulatum* sometimes reacted with both the homologous and heterologous allergens, but animals infected by *Paracoccidioides brasiliensis* (the cause of South American blastomycosis) did not develop sensitivity to coccidioidin. In contrast to the practice in the earlier surveys, the histoplasmin and coccidioidin used in the present work were prepared locally, and descriptions are given of the preparation of the extracts and the tests for potency. From preliminary tests on infected guineapigs it was found that the most suitable dilution of coccidioidin for use was 1 : 100 ; which gave reactions with 76·9 per cent. of the infected animals. A dilution of 1 : 1,000 was too weak and 1 : 10, although giving positive results in all, was unsuitable as it sometimes caused severe reactions with local necrosis.

In Uruguay the coccidioidin test was performed on 977 persons (452 males and 525 females), of whom 9 (3 males and 6 females) reacted (0·9 per cent.). These reactions to coccidioidin were not deemed to indicate coccidioidal infection but were attributed to non-specific sensitivity to coccidioidin in persons highly sensitive to histoplasmin, as demonstrated by parallel histoplasmin and coccidioidin tests performed on 360 members of the group.

In Argentina the coccidioidin test was performed on 833 persons, including 420 from Buenos Aires among whom only 6 reactors were found, but these reactions were attributed to coincident high sensitivity to histoplasmin. No reactors were found in the region of the great rivers. Small numbers of significant reactors were found among little groups of people tested in the hot and arid areas of the provinces of Santiago del Estero, San Juan, San Luis, Catamarca, Chaco, Formosa, Salta, Jujuy and La Rioja and in the uplands of

Córdoba. These areas corresponded closely in climate and geology with the endemic areas of coccidioidomycosis in the south-western part of the United States and that discovered by NEGRONI between the Rio Colorado and Rio Negro in Argentina. This bears out the view expressed by NEGRONI and others that endemic foci of infection would be found in such areas in the central and northern parts of the country. It is thought that the endemic area of coccidioidomycosis extends from Northern Argentina into the Paraguayan Chaco and probably into South-Eastern Bolivia. *J. T. Duncan*

TROPICAL ULCER

SERVINO, V. & TARIZZO, M. L'ulcera tropicale superficiale di Castellani. [**Tropical Superficial Ulcer of Castellani.**] *Acta Med. Italica.* 1950, Nov., v. 5, No. 11, 381–3.

Castellani has studied this condition in East Africa, during 1942, among the troops of the Italian Expeditionary Force, who called this leg ulcer "desert sore." By the use of a selective trypsin-agar, he isolated *Micrococcus mycetoides* and demonstrated its causative relation by inoculating it on volunteers. The condition is met with in the same territories as tropical ulcer, but it differs from the latter by a more acute onset, a less chronic course (recovery in about 4 months), its limitation to the outer layers of the skin, its prevalence among the young and strong and the absence of glandular involvement, fever and general signs and symptoms. Servino and Tarizzo now describe 2 indigenous cases in Rome, from which they have isolated *M. mycetoides* with which they have reproduced the condition in a volunteer. They have found the organism to be Gram-positive or Gram-negative according to the *p*H value of the culture medium. They use the term "tropicaloid ulcer" in one place and they suggest that the condition should be named "Ulcerative superficial dermatitis of Castellani, due to *Micrococcus* (*Coccobacillus*) *mycetoides.*" *J. Cauchi*

CASTELLANI, A. *Micrococcus* (*coccobacillus*) *mycetoides*, agent étiologique de l'ulcération tropicaloïde. [*M.* (*Coccobacillus*) *mycetoides*, **Aetiological Agent of Tropicaloid Ulcer.**] *Ann. Inst. Pasteur.* 1951, Jan., v. 80, No. 1, 83–6, 3 figs.

See this *Bulletin*, 1948, v. 45, 1116.

MISCELLANEOUS DISEASES

BALL, J. D. **Tropical Pulmonary Eosinophilia.** With communication by R. TREU. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Dec., v. 44, No. 3, 237–54, 4 text figs. & 4 figs. on 2 pls. [55 refs.] Discussion 254–8. [SHORTT, H. E. (President); OSWALD, N.; VISWANATHAN, R.; WILSON, H.; MISRA, S. S.; THOMPSON, B. C.; McROBERT, G. R.; BALL, J. D. (in reply)].

This paper is an authoritative and well-annotated description of this disease and should give the reader a clearer conception of it than any paper previously published, although there is little in it to throw any light on the aetiology.

In his history of the disease, the author gives due credit to FRIMODT-MÖLLER and BARTON [this *Bulletin*, 1941, v. 38, 539] for their first clear description of it, and to WEINGARTEN [*ibid.*, 1943, v. 40, 407] for his contribution to its treatment.

Of over 1,000 cases so far reported 95 per cent. have been in India, but the disease has a wide tropical distribution. [In the discussion Harold Wilson, mainly from his experience in East Africa, questioned whether this represented the true distribution ; he was of the opinion that many cases were being missed through insufficiently frequent blood examination in clinically suggestive cases.]

The author analysed the findings in 100 successive cases of this condition admitted to a hospital in Southern India. Fifty-one were children under the age of 14 years ; as the total hospital population was two adults to one child, there was thus a relative predominance among children. There was no occupational or seasonal predominance, except that there were two peaks, one in the cooler dry season and one in the rainy season, September, October and November. Most patients gave a history of suffering from the condition for 2 to 9 months, but some were seen within a few days of onset and others gave longer histories, up to 20 years. The onset is with an insidious dry cough in paroxysms, usually at night. Attacks increase in severity and duration, leading to dyspnoea and orthopnoea and simulating asthma. Some wheezing dyspnoea usually persists through the day. There may be remissions of varying duration, up to several years. In time the general health deteriorates. Feverishness is a common complaint, but fever is not the rule. Nearly half the author's cases (42) were afebrile, about half had a low fever, and only 7 had any sustained febrile attacks, and even these were remittant. There was no true haemoptysis but blood-streaked sputum occurred in 12 cases. Pain in the chest was prominent in 9 cases.

The common physical signs in the chest were medium or coarse crepitation at the bases and scattered rhonchi all over the chest, accompanied by wheezing expirations. All physical signs were absent in 6 cases.

The liver was enlarged in 45 per cent. of the children and in 16 per cent. of adults, but this was also found in half the healthy children. The spleen was enlarged in 8 per cent. of cases, in the virtual absence of malaria. There was some lymph gland enlargement in 57 cases and in 76 per cent. of the children. Filariasis was excluded.

There was a gross eosinophilia ; an average case showed 6,000 per cmm. ; that is a 40-fold increase. There was also a slight to moderate lymphocytosis, so that there was a corresponding leucocytosis.

The erythrocyte sedimentation rate was increased in two-thirds of the cases. Cold agglutinins were rare. Mites were found in 4 of 39 cases in which the sputum was examined. No microfilariae were found in the blood and fewer intestinal helminths than in a control series.

The radiological picture showed increase of normal striations in 39, miliary mottling in 31, hilar gland enlargement in 31 and no abnormality in 4 of 66 cases.

Only about 50 per cent. of cures were obtained by arsenical treatment ; mapharsen produced the best results, but acetarsone by mouth and intramuscular injection was also used.

Dr. R. TREU states that not more than 50 or 60 per cent. of cases show typical X-ray signs. He found relapses common, occurring in not less than 20 per cent. of cases, and he always warns patients that these may occur up to two years. In his experience response to arsenic is constant ; although relapses occur they respond to treatment. He considers that it is almost certainly a definite disease entity. [Dr. Treu described this condition and its treatment by arsenicals contemporaneously with and independently of Weingarten (this *Bulletin*, 1943, v. 40, 720)].

Dr. R. VISWANATHAN described some of his experimental work with animals on the aetiology of this condition. He was able to produce histological changes

suggesting this condition, but not eosinophilia except in one animal. He considered his experiments suggestive but not conclusive.

Dr. Harold WILSON had found mites in 3 out of 5 cases but he did not consider that there was evidence in favour of mites being the aetiological agent though he thought that they might be the transmitters. *L. E. Napier*

GOPALAN, C. **The Lathyrism Syndrome.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Dec., v. 44, No. 3, 333–8. [19 refs.]

The author reports 11 cases of a lathyrism-like syndrome occurring in Southern India among persons who did not eat *Lathyrus sativus* or *Vicia sativa*. He also collected 50 other cases from the records of the Government General Hospital, Madras.

All the subjects were poor and lived on grossly inadequate diets consisting mainly of rice gruel and " cheap vegetables " and not including the above-mentioned vetches.

The majority (41) were between the ages of 20 and 40 years : the youngest was a boy of 6 and the oldest a man of 59. There were three males to one female. [The general sex distribution of the hospital population is not mentioned.] They came from all parts of the province.

The onset was sudden in 9 cases, subacute in 21, and insidious in 19 [this amounts only to 49]. In 4 there was a history of preceding fever, and in 11 of paraesthesiae of the lower limbs.

The predominant symptoms were weakness and stiffness of the lower limbs. There were spasticity and exaggerated reflexes in the lower limbs in all cases. In the upper limbs the deep reflexes were normal except in 9 cases in which they were brisk. There were no sensory changes or sphincter disturbances except for precipitancy in 4 cases. No cranial nerves were involved and there were no mental changes.

There was no evidence of local cord lesions, the cerebrospinal fluid was normal and the blood Wassermann and Kahn reactions normal in all the cases.

No signs of specific dietary deficiencies were noted in the 50 hospital cases, but all 11 of the author's cases showed discoloration and thickening of the conjunctiva and sub-conjunctival tissue, four had mosaic dermatosis of the legs, two (aged 40 years) cataract, and one had night blindness.

The author is of the opinion that the lathyrism syndrome is caused by dietary deficiency which lowers the resistance of the lower segments of the cord to toxic agents. *L. E. Napier*

JACOBS, E. C., BUTZ, W. C. & FELTS, J. H. **Ainhum (Dactylolysis Spontanea). Report of a Case.** *Amer. J. Clin. Path.* 1951, Jan., v. 21, No. 1, 56–60, 8 figs. [18 refs.]

" A case is presented of bilateral ainhum of the fifth toes of a 25-year-old Negro, a native of Virginia and a veteran of the war in the southwest Pacific."

SANYAL, P. K. **Argemone and Mustard Seeds.** *Indian Med. Gaz.* 1950, Nov., v. 85, No. 11, 498–500, 8 figs. (6 on pl.).

Though seeds of *Argemone mexicana* contaminating mustard oil are accused of being the cause of epidemic dropsy, the author states that the symptoms may occur, as in Banaras in 1934–1939, when no mustard oil was being taken. A possible explanation of this is that a contaminated mustard oil may have been used as an unguent before bathing.

The usual excuse given for the contamination is that both may grow in the same field, that the seeds are not easily distinguished and that they are gathered simultaneously. The author, however, points out that there are very clear distinctions between the plants and the seed-pods, that mustard is sown after the October rains and harvested in January and February, whereas Argemone does not mature before May, when the mustard has already been collected and stored. A *few* Argemone plants may grow in the same field as mustard, but if they are numerous they have almost certainly been deliberately cultivated and, therefore, " the presence of an appreciable amount of argemone in mustard oil must be regarded as wilful and should be stopped by law," and where any such is found it should be made unfit for human consumption and used for illumination, soap-making, or as a lubricant. There is a great temptation for unscrupulous dealers to make the adulteration because the cost of argemone seeds is less than one-seventh that of mustard seeds. *H. Harold Scott*

PROTOZOOLOGY : GENERAL

PIEKARSKI, G. *Toxoplasma gondii* als Parasit des Menschen und der Tiere. (Eine Übersicht.) [*T. gondii* **as a Parasite of Man and Animals : a Review.**] *Ztschr. f. Parasitenk.* 1950, Nov. 2, v. 14, No. 6, 582–625, 11 figs. [Numerous refs.]

This is a critical review of the present state of knowledge regarding human and animal toxoplasmosis. In recent years a number of similar reviews have appeared in different languages, but the present paper provides one of the best accounts of the parasite and the disease, and is accompanied by a very complete bibliography. It does not lend itself to an abstract, but an indication of its contents will be useful to those who desire to consult the original. The paper is divided into the following sections : (1) Geographical distribution (this is now thought to be world-wide) ; (2) morphology and systematic position of *Toxoplasma* (the latter is not clear but shows affinities with the Sarcosporidia) ; (3) Cultivation ; (4) Occurrence of toxoplasms : (*a*) in animal hosts, (*b*) in man (clinical characteristics of toxoplasmosis in different age-groups) ; (5) Host-parasite relations and serology (description of serological diagnostic methods : Frenkel's skin test, Sabin & Olitzky's rabbit-skin neutralization test, Warren & Sabin's complement fixation test, and Sabin & Feldman's dye-test) ; (6) Transmission and epidemiology ; (7) Chemotherapy (especially with aureomycin). *C. A. Hoare*

MOOSER, H. Toxoplasma in Zuchten weisser Mäuse. [*Toxoplasma* **in White Mouse Colonies.**] *Schweiz. med. Woch.* 1950, Dec. 30, v. 80, No. 52, 1399–400.

The author points out that more than twenty years ago, when working on typhus fever in Mexico, he drew attention [*J. Inf. Dis.*, 1929, v. 44, 186] to the occurrence among experimental guineapigs of a toxoplasmic infection producing histopathological changes like those in typhus fever. This similarity to typhus lesions was subsequently noted in a fatal case of human toxoplasmosis by PINKERTON & HENDERSON [*J. Amer. Med. Assoc.*, 1941, v. 116, 807] who had overlooked Mooser's earlier paper.

The author states that in Zurich he never encountered toxoplasms in guineapigs inoculated with material derived from other guineapigs, but these parasites were found in guineapigs and mice following intraperitoneal inoculation with suspensions of organs (brain, lung, spleen) of mice. Some of these strains proved to be as virulent for guineapigs as the Mexican strains, but others were only slightly virulent, producing in guineapigs merely a fever lasting several days, from which they recovered spontaneously.

From these observations it is concluded that in Switzerland mice might serve as reservoir hosts of toxoplasmosis. Some evidence is produced of contact between wild " domestic " mice (*Mus musculus*) and the tame albinos, and it is thought that the former represent the original source of toxoplasmic infection which is probably transmitted to the white mice through ectoparasitic arthropods. As regards the possible vector of murine toxoplasmosis to man, the flea, *Leptopsylla segnis*, can be excluded, since it does not attack human beings ; it is more probable that the disease is transmitted by the blood-sucking mite, *Liponyssus muris*, which is occasionally found on man. It is noted, however, that attempts to transmit the infection from mouse to mouse, with the help of this mite, have failed.

The natural infection, both of guineapigs in Mexico and of mice in Switzerland, runs a chronic course without any clinical symptoms, which are only manifested in experimentally infected rodents in the course of serial passages. This condition is comparable to the inapparent form of human toxoplasmosis observed in mothers whose children are born with acute symptoms of the disease, whereas their own infection can only be detected by serological methods.

Since Swiss guineapigs appear to be free of infection, the author recommends the substitution of mice by young guineapigs for experimental purposes.

C. A. Hoare

GINGRICH, W. D. & DARROW, Edith M. **The Effect of Endochin on Experimental Toxoplasmosis.** *Amer. J. Trop. Med.* 1951, Jan., v. 31, No. 1, 12–17.

Because *Toxoplasma* is an intracellular parasite the authors have tested the activity of a number of drugs active against the tissue forms of malaria, in canaries and mice infected with this organism. While it is known that sulphonamides and sulphones exert a suppressive effect on this infection they do not bring about cure. The canaries used weighed 15–20 gm. and were inoculated intramuscularly with a saline suspension of mouse tissue infected with *Toxoplasma*. Drug was administered orally soon after inoculation and was continued for several days. Mice weighing 10 to 15 gm. were inoculated intraperitoneally with infective material. In their case drug was given in diet. The results with sulphadiazine and promin (a sulphone) confirmed those of earlier authors. Endochin, which was shown by KIKUTH and MUDROW-REICHENOW [this *Bulletin*, 1949, v. 46, 220] to possess prophylactic activity in avian malaria, was somewhat less active in toxoplasmosis than the above two substances. Combined treatment with sulphadiazine and Endochin was no more effective than either drug alone. A number of other substances active against exo-erythrocytic forms in malaria, whose SN numbers are given [WISELOGLE—*Survey of Antimalarial Drugs*, 1941–45 ; this *Bulletin*, 1947, v. 44, 1106] proved ineffective in experimental toxoplasmosis.

[Endochin is described in the text as an acridone but is in fact 3-heptyl-4-hydroxy-7-methoxy-quinaldine.] *J. D. Fulton*

ENTOMOLOGY AND INSECTICIDES: GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

LANE, J. **Zoogeography of the Culicidae in the World.** Reprinted from *Arquivos Museu Paranaense.* Curitiba. 1949, Dec., v. 7, 247–64, 1 pl. (map). English summary.

The author presents in several tables an analysis of the distribution of the mosquitoes of the world. First, he gives the number of genera and subgenera (out of a total of 119) occurring in each of the six regions. This is elaborated in another table, which shows the distribution of each genus or subgenus separately. From these figures it is interesting to find that, of the tribe *Anophelini* the Neotropical region has ten genera, the Australasian four and the other regions two or three each, while the tribe *Culicini* is well represented in all regions, but attains the greatest number of genera or subgenera in the Oriental (37) and Australasian (30).

The distribution of species is discussed in the second part of the paper where tables show the number of species found in each region, classified as "indigenous" and "present". The percentage of indigenous species is 93, while those present in two or more regions form only 7 per cent. There are, of course, some "borderline" species which cannot, with precision, be assigned to one region. *H. S. Leeson*

HSIAO, Tsai-Yu & BOHART, R. M. **The Mosquitoes of Japan and their Medical Importance.** *Navmed No. 1095.* Washington, Navy Dept., Bureau of Medicine and Surgery. 1946, pp. 2+44, 3 pls. [58 refs.]

This is a synopsis in English. It contains keys to the identification of the adults of 44 species of mosquitoes and their known larvae, notes on taxonomy, bionomics and the medical importance of each species and brief accounts of the mosquito-borne diseases in Japan. Altogether, six species of *Anopheles* are dealt with, 17 of *Aëdes*, 15 of *Culex* and one each of six other genera, and the wings and larval characters of some of the mosquitoes are illustrated.

Filariasis (*Wuchereria bancrofti*) occurs in some localities but more commonly in Kyushu and adjacent islands. The mosquitoes named as being most suitable as vectors are *Aëdes togoi*, *Culex pipiens pallens*, *C. vagans*, and *C. whitmorei*. Some work has been done on Japanese B encephalitis, especially since the great epidemic of 1924. Natural infection has been found in *Culex pipiens pallens* and *C. tritaeniorhynchus*; hereditary transmission of the virus by these mosquitoes is also reported. Before World War II, malaria was not a serious health problem in Japan and the disease was not notifiable, but some figures are given showing that the endemic form occurring since is that caused by *Plasmodium vivax*. The vector is *Anopheles hyrcanus sinensis*. *P. falciparum* occurs in the southern islands. *Aëdes albopictus* is strongly suspected as the vector of dengue since *Aëdes aegypti* has not been reported on the main islands. Two cases of yellow fever reported in 1927 and one in 1937 were probably not indigenous. *H. S. Leeson*

SASA, M., KANO, R., HAYASHI, S., KIMURA, M., MIURA, A., OYAMA, K., SATO, K., HOSOYA, H. & HASEGAWA, K. **Two Years' Observation on the Seasonal Activities and Zoophilism of Mosquitoes in Tokyo, by Animal Trap Method.** *Japanese J. Exper. Med.* 1950, Mar. 30, v. 20, No. 4, 509–17.

Before describing their present work, the authors refer briefly to some investigations they made in 1946 in Okayama. By using chicken, horse, goat,

rabbit and man in traps they showed that *Anopheles hyrcanus sinensis*, *Culex tritaeniorhynchus* and *C. vishnui* preferred to feed on the larger domestic animals, whereas *Culex pallens* and *Culex bitaeniorhynchus* were attracted to chickens.

In 1948 and 1949 they repeated the work in the Tokyo area, using goat, rabbit and chicken in 1948 and the same animals plus a horse in 1949. The traps were opened only at night, therefore species of mosquitoes attracted mainly in the daytime were not recorded. Collections were made weekly throughout the whole period and the total number of mosquitoes obtained was 22,875, belonging to 12 species of 4 genera. Four of the species represented 99 per cent. of the total ; these were *Culex tritaeniorhynchus*, 56 per cent. ; *Aëdes nipponi*, 24 per cent., *Culex pallens*, 17 per cent. and *Anopheles h. sinensis* 2 per cent. The collections are set out in graphs and compared with the case curves for encephalitis.

Horse attracted the largest numbers (92 per cent. of the total) in 1949. Chicken attracted the greatest numbers of *Culex pallens*. In 1948, 60 per cent. of *C. tritaeniorhynchus* were attracted to goat but in 1949, 93 per cent. were found in the horse trap. *Aëdes nipponi* and *Anopheles hyrcanus sinensis* preferred horse and none of the *Anopheles h. sinensis* attacked chicken. In 1949 over 99 per cent. of the *Anopheles h. sinensis* were found fully engorged in the horse trap and 100 per cent. in the goat trap. The highest engorgement rate (99 per cent.) in the chicken trap was shown by *Culex pallens*.

The authors are careful merely to present the data without drawing any conclusions. *H. S. Leeson*

Boyer, J. & Corre, L. La lutte contre les moustiques sur les aerodromes d'Orly et du Bourget. [**Anti-Mosquito Measures on the Airports of Orly and Le Bourget.**] *Ann. d'Hyg. Pub., Indust. et Sociale.* 1950, Nov.–Dec., v. 28, No. 6, 278–84.

When, in 1946, the *Service du Contrôle Sanitaire aux Frontières Aériennes* was started, the conditions at many French airports was deplorable. Water and refuse were discharged carelessly and rats increased. Numerous bomb craters and ruins favoured mosquito breeding. The mosquitoes were almost exclusively culicine, especially *Neoculex pyrenaicus* and *Taeniorhynchus richardii* ; these were a great nuisance but not an actual danger to health, so that supplies of insecticides, etc., were not immediately available. Later, DDT powder was provided and work was undertaken to fill in holes and to clear and cultivate rough land near the aerodrome. The insecticide was not used in the wholesale way employed in some areas in the U.S.A. because this was considered wasteful and also dangerous to beneficial insects and fish. After a preliminary survey the procedure adopted is as follows :—

(*a*) A spraying team treats all the outsides of buildings with DDT.
(*b*) A spraying team treats all breeding sites with DDT in kerosene, and regularly visits all points marked on a map.
(*c*) Interiors of buildings are sprayed with DDT in kerosene (taking care to ensure that operators wear masks while working).

It is emphasized that prevention of breeding by filling in or draining possible breeding sites is more satisfactory than cure by insecticides. *J. R. Busvine*

Tew, R. P., David, W. A. L. & Busvine, J. R. **Factors affecting the Efficiency of Aircraft Disinsectisation Procedures.** *Monthly Bull. Ministry of Health & Pub. Health Lab. Service (directed by Med. Res. Council).* 1951, Feb., v. 10, 30–38.

The authors continue their careful work intended to define the most effective way of killing insects, particularly mosquitoes and houseflies, in aircraft [this

Bulletin, 1950, v. 47, 894]. In the present paper they have continued to make some use of insects in wire gauze cages but they also repeatedly used considerable numbers which were flying freely in the cavity of the aircraft. The test species of insects were houseflies (*Musca domestica*) and yellow fever mosquitoes (*Aëdes aegypti*). The work was carried out in the summer and autumn months in Great Britain in two types of commercial aircraft, on the ground.

The authors feel that their previous recommendations were unnecessarily cautious, largely because free-flying insects are more easily killed than those in cages, which are partly protected by the wire gauze. It has, therefore, been possible to reduce the dosage and the period during which the aircraft must be kept closed.

The authors' recommendations are as follows :—

"(1) Use a low-pressure aerosol dispenser, such as CMR 1, containing 0·4 per cent. pyrethrin and 3 per cent. DDT. Probably CMR 3 would be equally satisfactory, though it has not been so fully tested.

"(2) Use a dosage of 10 gm. per 1,000 cu. ft.

"(3) Use a dispenser distributing not more than 1 gm. per second, otherwise it is difficult to get round the plane without overdosing.

"(4) Keep the doors closed for not less than 5 minutes (or longer if convenient) after all the spray has been applied.

"(5) Although it has been shown that disinsectisation may be effected at dosages which passengers might not find objectionable, their presence is, in our view, likely to interfere with the distribution of the aerosol apart from providing more sheltering places for insects. We recommend, therefore, treatment after luggage has been loaded but before the passengers embark."

P. A. Buxton

PAL, R. **Synergistic Action of DDT and BHC Combined Sprays.** [Correspondence.] *Nature*. 1951, Mar. 3, 368.

In laboratory tests in the Malaria Institute of India, Delhi, and in the field and villages in the Punjab, a combined spray of DDT and benzene hexachloride (BHC) was used against houseflies and mosquitoes [species not stated].

The spray contained 25 mgm. DDT and 5 mgm. BHC gamma isomer per sq. ft.; it was compared with a deposit of 50 mgm. DDT or 10 mgm. gamma isomer per sq. ft. applied separately.

The combination gave a longer residual effect (for two weeks or more) than DDT or BHC alone, and was more effective in keeping down mosquito density in the villages. The residual effect with suspensions was better than that with emulsions or solutions. [No other experimental details are given.]

H. J. O'D. Burke-Gaffney

HANSENS, E. J. **House Fly Control in Dairy Barns.** *J. Econom. Entom.* 1950, Dec., v. 43, No. 6, 852–8.

LAAKE, E. W., HOWELL, D. E., DAHM, P. A., STONE, P. C. & CUFF, R. L. **Relative Effectiveness of various Insecticides for Control of House Flies in Dairy Barns and Horn Flies on Cattle.** *J. Econom. Entom.* 1950, Dec., v. 43, No. 6, 858–61.

MORRISON, H. E., LAUDERDALE, R. W., CROWELL, H. H. & MOTE, D. C. **Space Spraying for Fly Control in Dairy Barns.** *J. Econom. Entom.* 1950, Dec., v. 43, No. 6, 846–50.

SACKTOR, B. **A Comparison of the Cytochrome Oxidase Activity of Two Strains of House Flies.** *J. Econom. Entom.* 1950, Dec., v. 43, No. 6, 832–8, 4 figs. [22 refs.]

" 1. Cytochrome oxidase activity of two strains of adult house flies was compared utilizing a spectrophotometric technique.

" 2. The oxidase activity of flies does not remain constant throughout adult life. There was an increase of over 50 per cent and 100 per cent within the first 2 hours and 1 day, respectively, after emergence. There was a slight increase in activity on the second day. Subsequently, in the normal strain, this high level was generally maintained. In the resistant strain the enzyme's activity decreased and then increased to a small extent.

" 3. On a weight basis there was greater oxidase activity at a given age for the males as compared to females in the normal strain. It was about the same for the sexes in the resistant strain.

" 4. The resistant strain had a greater oxidase activity than did the normal strain. The average higher activity for all ages was 64 and 36 per cent for, respectively, females and males.

" 5. It is suggested that one of the explanations for the resistance of house flies to DDT may be a greater cytochrome oxidase activity in the resistant flies. Apparently other factors are also involved.

" 6. The relationship between cytochrome oxidase activity of aged resistant flies and their susceptibility to DDT is discussed."

TAYLOR, H. M. **Screwworm** (*Cochliomyia americana*) **Infestation in Man.** *Ann. Otology, Rhinology & Laryngology.* 1950, June, v. 59, No. 2, 531–40, 5 figs.

In 1933, with the transfer of large herds of cattle from the " dust bowl " South-western States of U.S.A., the screwworm became introduced into Florida and Southern Georgia. The first cases of human infestation in Florida were reported in 1937. The author has, since then, treated 8 cases, and mentions the possibility that, with increasing air travel, the disease may be encountered by physicians not familiar with it. The unpleasant nature and high mortality of the disease is emphasized.

An account is given of the fly and its habits, and of the symptoms, diagnosis, complications, and treatment of the myiasis caused by the larvae. There are no individual case histories nor any indication of the mortality among the author's patients. Complications observed by the author include fatal bacterial infection, severe nasal haemorrhage, and extensive destruction of nasopharyngeal tissue. In one case, the right eye was swollen shut and a screwworm maggot was found in the lachrymal duct. The fly is attracted by diseased conditions of the nose or by open wounds, and protection, by fly screens, of sufferers from nasal disease, is recommended.

A. J. P. Goodchild

SCHWETZ, J. **Sandflies in Aloro, Uganda.** [Correspondence.] *J. Trop. Med. & Hyg.* 1951, Feb., v. 54, No. 2, 47.

In this letter, the author states that during his study of mosquitoes in Aloro [above, p. 511] he noted that sandflies were very rare and found only in a latrine. Altogether 33 specimens were collected (13 females) : they were identified by DR. PARROT of the Institut Pasteur d'Alger.

All species belonged to the sub-genus *Prophlebotomus*. There were 8 species represented in all and they were identified as follows :—

(1) *P. bedfordi* (=*P. congolensis* var. *distinctus*), 7 males.
(2) *P. bedfordi* var. *congolensis* (=*P. congolensis*), 2 males, 1 female.
(3) *P. schoutedeni*, 4 females.
(4) *P. richardi*, 1 female.
(5) *P. mansoni*, 2 males, 1 female.
(6) *P. antennatus* var. *cinctus* (=*P. cinctus*), 1 male.
(7) *P. africanus*, 8 males, 5 females.
(8) *P. africanus* var. *niger*, 1 female. *H. J. O'D. Burke-Gaffney*

DAVIES, D. M. **Some Observations of the Number of Black Flies (Diptera, Simuliidae) Landing on Colored Cloths.** *Canadian J. Zool.* 1951, Feb., v. 29, No. 1, 65–70, 4 figs. (2 on 2 pls.).

"The number of black flies alighting on cloths of different colors, each tested with a control of black cloth, varied with the intensity of the light reflected from the cloth and to a lesser extent with the wavelength. Dark blue was the color most frequented followed by dark brown, black, dark green, dark red, medium gray, and white."

DALMAT, H. T. **New Species of Simuliidae (Diptera) from Guatemala II.** Reprinted from *Ann. Entom. Soc. of America.* 1950, Mar., v. 43, No. 1, 137–51, 21 figs. on 5 pls.

HOCKING, B. **Further Tests of Insecticides against Black Flies (Diptera : Simuliidae) and a Control Procedure.** Reprinted from *Scientific Agric.* 1950, Dec., v. 30, 489–508, 11 figs. [11 refs.]

An earlier paper by HOCKING, TWINN and MCDUFFIE [this *Bulletin*, 1951, v. 48, 208] reported experiments on the control of *Simulium* larvae in Manitoba in 1947. This paper records further experiments of the same kind, done in 1948 and 1949. In 1948 two experiments were done with parathion in comparison with DDT. The parathion was effective at 3 p.p.m./minutes (*i.e.* concentration in parts per million multiplied by minutes of application) but not at one-sixth of this dose, whereas DDT was effective in both tests at 1·7 and 1 p.p.m./minutes (in larger streams).

The author quotes an unpublished report by van STEENBURGH and TWINN in which a fairly large river (flow 18,000 cu. ft. per sec.) was successfully cleared of *Simulium* larvae for a distance of 15 or 20 miles. This was done by simultaneously pouring the contents of 5 drums of 5 per cent. DDT into the river over a period of 10 minutes, calculated to give 1 in 7 million DDT, over the period (1·4 p.p.m./minutes). This is the largest successful river treatment reported in Canada.

In 1949 the author carried out a considerable number of experimental applications of the following insecticides to *Simulium*-infested streams : trichlor benzene, dieldrin, aldrin, methoxychlor, gamma BHC and parathion. Rates of 1·5 to 15 p.p.m./minutes were used. The recorded results are rather inconsistent, but there is no evidence that any of the chemicals was superior to DDT. Some of them showed slight toxicity to pupae, but when tests were conducted in the laboratory with trichlorbenzene and gamma BHC, the former had no effect and the latter actually stimulated emergence in all tests. The pupae certainly become highly resistant to insecticides as they approach maturity. Some collections of other aquatic fauna killed by the insecticides gave no indication that any of them was selectively toxic to *Simulium*.

A few tests were done with small numbers of various kinds of fish, and these gave encouraging results, for none of the fish was seriously affected by concentrations of DDT well over those necessary to kill *Simulium*.

An appendix describes a dispenser for applying DDT solution steadily to a stream from a drum reservoir. The flow is calibrated by a liquid manometer and the dose is calculated as follows : volume of 10 per cent. DDT solution required is $17 \times VWD$ ml. (V=velocity of stream ft./sec. ; W=width and D=depth in feet) to be applied as evenly as possible over 15 minutes. (This corresponds to 1 p.p.m./minute.) *J. R. Busvine*

Evans, F. C. & Freeman, R. B. **On the Relationships of some Mammal Fleas to their Hosts.** Reprinted from *Ann. Entom. Soc. America.* 1950, Sept., v. 43, No. 3, 320–33. [21 refs.]

This flea survey was made in Bagley Wood, near Oxford, England. Fleas were collected from trapped small mammals which were marked and afterwards released for subsequent recapture. The observations were made at monthly intervals from May 1938 through April 1939 with the exception of July and August. Most of the animals were in the traps for less than 12 hours and were alive when examined. Records of fleas from dead animals are not included in this account.

Only the wood mouse (*Apodemus sylvaticus sylvaticus*) and the bank vole (*Clethrionomys glareolus brittanicus*) were caught frequently enough to provide adequate flea data. There were 275 infested out of 730 *Apodemus* and 178 infested out of 325 *Clethrionomys*. A total of 1,213 fleas belonging to nine species were collected and of these 650 were from *Apodemus* and 556 were from *Clethrionomys*. *Ctenophthalmus agyrtes nobilis* formed 83 per cent. of the total flea fauna, 605 of which occurred on *Apodemus* and 411 on *Clethrionomys*. This flea is by far the most abundant on small British rodents. A single specimen of *Nosopsyllus fasciatus* found on *Clethrionomys* was probably a straggler from a small colony of *Rattus norvegicus* living about half a mile away.

It is suggested that the nests and burrows are the principal flea foci rather than the animals themselves and that reinfestation takes place within 24 hours of being dis-infested. Gravid females were found all the year round and a mite (*Tyroglyphus farinae*) was sometimes recorded as a " rider ".

Though the data on this occasion are not very extensive, it is believed that flea indices calculated from initial and subsequent captures did not differ strikingly from those obtained from the usual type of flea survey.

H. S. Leeson

Davis, G. E. **Parthenogenesis in the Argasid Tick** *Ornithodoros moubata* **(Murray, 1877).** *J. Parasitology.* 1951, Feb., v. 37, No. 1, 99–101.

" Thirty-eight of 48 ticks hatched from unfertilized *O. moubata* eggs were reared to adults. All were females. Oviposition in unfertilized females was much delayed and the interval between hatching and molting of their progeny was much prolonged. When a parthenogenetic female was mated with a normal male both sexes were represented in the progeny."

See also p. 558, Pierquin, **Relation de quelques essais concernant l'efficacité, sur** *Ornithodorus moubata*, **de trois insecticides à base de l'isomère " Gamma " de l'hexachlorure de benzène.**

Harvey, G. T. & Brown, A. W. A. **The Effect of Insecticides on the Rate of Oxygen Consumption in** *Blattella*. *Canadian J. Zool.* 1951, Feb., v. 29, No. 1, 42–53, 8 figs. [14 refs.]

ORSER, W. B. & BROWN, A. W. A. **The Effect of Insecticides on the Heartbeat of *Periplaneta*.** *Canadian J. Zool.* 1951, Feb., v. 29, No. 1, 54–64, 5 figs.

J. AMER. MED. ASS. 1950, Sept. 9, v. 144, No. 2, 104–8. **Pharmacology and Toxicology of certain Organic Phosphorus Insecticides. Report from the Committee on Pesticides to the Council on Pharmacy and Chemistry** [ROHWER, S. A. & HALLER, H. L. ; DUBOIS, K. ; GROB, D. ; ABRAMS, H. K., HAMBLIN, D. O. & MARCHAND, J. F. ; LEHMAN, A. J., HARTZELL, A. & WARD, J. C.]

[This paper is reviewed in *Bulletin of Hygiene*, 1951, v. 26, 270].

LABORATORY PROCEDURES

GALL, D. & ANDREWS, W. H. H. **A Simple Method of taking Stereoscopic Photomicrographs.** *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 339–41, 1 text fig. & 5 figs. (3 coloured) on 2 pls.

SEN GUPTA, P. C., MALLICK, K. C. B. & BHATTACHARYA, B. **A Rapid Method of Iron Haematoxylin Stain for Protozoa in Tissue Sections and Smears.** *Indian Med. Gaz.* 1950, Sept., v. 85, No. 9, 400–402, 3 figs. on pl.

The staining method described in this paper is a modification of that introduced by Prof. De, of Calcutta. A 1 per cent. solution of haematoxylin is ripened by adding to it 2·5 per cent. of a 4 per cent. aqueous solution of bleaching powder and exposing the mixture to sunlight for a month. Before use, 1 volume of a 2 per cent. iron alum solution is added to 2 volumes of haematoxylin solution. This stain can be used for protozoa in tissue sections and in smears after fixation in Zenker's and Schaudinn's fluids respectively. While sections can be stained in 15–20 minutes, smears require 20–30 minutes. Differentiation, under microscopical control, is carried out with acid alcohol or with saturated aqueous solution of picric acid (1–6 minutes), which is ultimately washed out, and the preparation is " blued " in running tap water. If required, the preparation can be counterstained in a weak aqueous solution of eosin. This method is considerably more rapid than the conventional iron haematoxylin methods, and has the advantage of mordanting and staining in one process. The results of staining are illustrated in three photomicrographs. *C. A. Hoare*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

CONGO BELGE. Direction Générale des Services Médicaux. Rapport annuel 1949. [**Annual Report of the Medical Directorate-General.**] 97 mimeographed pp., 1 chart.

The Staff of the medical services of the Belgian Congo was somewhat increased in 1949, and this included 20 additional doctors. Some extension of medical buildings was accomplished, especially in the Léopoldville Province. Reference is made to the Franco-Belgian co-operation through the medium of the Permanent Inter-African Tsetse and Trypanosomiasis Bureau. The use of insecticides in malaria control continued to show great promise, but in some areas air-spraying was restricted through lack of aircraft. The good results in insecticidal control of the vector of filariasis in Léopoldville were maintained. On the whole, spraying from the ground produced good results where suitable facilities were available, but does not justify the abandonment of traditional methods of control as well.

The good results in the campaign against sleeping sickness, both as a result of " pentamidinization " and of treatment, constituted one of the most encouraging features of the medical services during the year.

Considerable expansion of the leprosy services was made possible owing to assistance from the *Fonds Père Damien*. Treatment by sulphones became general and although this has improved most of the cases, it cannot yet be claimed to have proved a radical and specific cure.

In tuberculosis also, despite the general use of new remedies, no striking change can be claimed and the position is still confused owing to the low hygienic state of the indigenous people. However, over the last 10 years it does not appear, at least in the larger centres, that tuberculous morbidity and mortality show increased progression.

The general returns of the Report follow those of previous years and include the useful detailed figures which one has come to expect in this connexion. Among other points it is noted that there were 14 cases of *plague* in the Lake Albert area and 6 in Lake Edward. All the cases were fatal : it is noted that 16 were of the septicaemic type. There were 3 fatal cases of *yellow fever* in Africans in the Eastern Province. *Smallpox* occurred in 7 Europeans, with one death and in 1,440 Africans, with one death. There were 682,135 vaccinations and about 1½ million revaccinations. Fevers of the *typhus* group occurred in 25 Europeans and 174 Africans : 5 of the latter died.

There were 4,777 cases of *malaria* in Europeans with 14 deaths (0·29 per cent.) and 188,973 in Africans with 484 deaths (0·25 per cent.). *Blackwater fever* occurred in 22 Europeans with 3 deaths and 41 Africans with 8 deaths. There were two cases of *sleeping sickness* in Europeans : both recovered. Among nearly 5 million Africans examined 7,609 new cases were found (index 0·15). *Leprosy* occurred in two Europeans. Among Africans 87,476 cases were treated by the various organizations.

There were 525 cases of *amoebic dysentery* in Europeans, with no deaths, and 8,611 in Africans, with 87 deaths (1·01 per cent.). *Schistosomiasis* (rectal) occurred in 37 Europeans and 9,428 Africans : 43 of the latter died. The vesical form occurred in 717 Africans, with 1 death. Mobile teams travelled throughout the Kasai and Eastern Provinces to detect and treat cases of schistosomiasis. There were 20 cases of *rabies*, all in Africans.

Statistics are given for various other diseases and the Report contains the usual full account of the various Government, missionary and other medical organizations and of the various public health services.

H. J. O'D. Burke-Gaffney

i. Congo Belge. Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes du Congo Belge. Rapport sur l'Activité durant l'année 1948. [Dricot, C., Médecin-Directeur du Fonds en Afrique]. [**Report of the Activities of Foréami during 1948.**] 148 pp., 10 figs. on 4 pls., 3 maps (2 folding), 7 diagrams & 3 graphs (1 folding). [1950.] Brussels : 39 Rue de Commerce.

ii. ——. Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes du Congo Belge. Rapport sur l'Activité durant l'année 1949. [Dricot, C., Médecin-Directeur du Fonds en Afrique]. [**Report of the Activities of Foréami during 1949.**] 114 pp., 1 folding map, 7 diagrams & 3 charts. [1950.] Brussels : 39, Rue du Commerce.

i. The aims and methods of this medical service in a restricted part of the Belgian Congo, where it operates independently of, though in close association

with, the colony's general health services, have been sufficiently described in abstracts of its earlier Reports [see this *Bulletin*, 1948, v. 45, 816 ; *ibid.*, 1949, v. 46, 785 & 913]. A general account of the organization's history since its inception in 1930 was presented to the Royal Society of Tropical Medicine and Hygiene in January 1951 by Professor MOUCHET and will be reviewed in this *Bulletin* in due course. An unusually high level of medical service is provided and the author refers to the " paradox of the bush " (" *paradox de la scène de brousse* "), whereby the most primitive African is afforded the most modern scientific forms of relief, such as the newest antibiotics and chemotherapeutic agents, before he has learnt so much as to handle a knife and fork at table.

Great importance is rightly laid on maintaining accurate census figures, without which health programmes could not be efficiently carried out and results could not be evaluated. The people's confidence is being increasingly gained, as testified by increasing attendances at the organization's hospitals and dispensaries. It is of some interest that since the war there has been a greater tendency for medical officers and " sanitary agents " to arrive for their first tours of service with wives and children. Although this naturally causes some difficulties in bush life, yet the fact of being able to enjoy some form of family life is a stabilizing influence, which reflects favourably on the quality of work accomplished.

The Foréami's main activities continue to be centred in the Kwango District, where there has been much construction of permanent or semi-permanent buildings for hospitals, dispensaries, and dwellings for the staff (illustrated by photographs), as well as a considerable extension of the road network. Dispensaries are separated from one another by about 25 km., so that one can always be reached on foot in less than two hours. The pre-war cadre of 15 medical officers and 20 " sanitary agents " is not quite restored, but it has nevertheless been possible to examine medically more than 90 per cent. of the registered population (630,919 settled and 18,230 floating).

A five-year plan of intensified activity (partly aided by proceeds of the Colonial Lottery !) was launched for 1948–1952, and the report contains a long discussion of the relative functions of medical officers and subordinate staff in work of this nature. One of the aims in this five-year plan is to provide two medical officers for the headquarters of each sub-sector, so that there may be no break in the continuity of expert supervision of the hospital as well as of the itinerant medical service in each sub-sector. This improvement has already been provided for two of the six sub-sectors which comprise the Kwango area.

Crude death rates from 1937 to 1945 were usually above 30 per 1,000. In 1946, 1947 and 1948, however, they were 25·30, 25·75 and 25·08 ; birth rates for these three years were 37·40, 41·24 and 40·06 ; and infant mortality rates 104·1, 91·0 and 96·8 per 1,000 births. There were no serious epidemics, but only minor outbreaks of bacillary dysentery and of measles and whooping-cough. The dysenteric outbreak was met partly by mass prophylaxis with sulphaguanidine and with a vaccine prepared in Léopoldville from a bacterial strain isolated in the epidemic area.

The incidence of trypanosomiasis remains at the low rate of about 0·2 per cent. Mass prophylaxis by pentamidine, first applied in several centres in 1945 and 1946, has been highly successful, and its general application by the French authorities on the right bank of the Congo River has much reduced the influx of new cases. By international arrangement there will be general " pentamidinization " on both sides of the river every six months during 1949 and 1950.

As for malaria, 2,230 cases were diagnosed among people presenting themselves for treatment. The general incidence is not accurately known, but is undoubtedly high and has been shown, as is the rule for malaria, to be highest in infants under two years of age. Investigations are proceeding on the efficacy

of various formulations of DDT variously applied (the subject of a lengthy appendix by HIMPE and PIERQUIN) and of the comparative prophylactic activities of chloroquine and proguanil.

Details are given of the distribution, incidence, and methods of treatment of diseases of all kinds in each part of the area served by the Foréami, and of the work of its hospitals and maternity and child welfare centres. Details are also given of the medical work of private industrial and agronomic organizations, and of missionary societies ; all this work is co-ordinated with that of the Foréami. The Report concludes with miscellaneous contributions by individual members of the staff on investigations in which they are engaged.

ii. The five-year plan of intensified effort, started in 1948, has made substantial progress. European medical and auxiliary staff has been increased (though still short of full requirements), more permanent buildings have been constructed (full details are given), and activity under all headings has accelerated. It is symptomatic of the times, and is indeed a by-product of the raised general standards of living [to which the Foréami itself has contributed so much] that African auxiliary staff seem to be increasingly reluctant to remain in a service which often necessarily imposes the discomforts of bush life. The need is therefore recognized of paying special attention to social amenities in arranging the conditions of service of the subordinate staff.

The Report includes some sombre reflections on the African peasant's apathy towards personal hygiene ; he will observe the rules, merely in order to please, so long as he is under observation, but reverts to his accustomed ways immediately afterwards. When his economic lot improves, such items as bicycles and beer take precedence over sober and purposive self-improvement. [How true this is, also, of large sections of communities elsewhere than in primitive Africa !]

The scene of operations continues to be the Kwango District, and the census lists now contain 669,699 names, 21,466 representing the floating population. The crude death rate was 22·70 per 1,000, the birth rate 43·10, and the infant mortality rate 81·5 per 1,000 births. There was again no major epidemic of any infective disease, a circumstance which the author feels justified in attributing not to mere chance but to the energetic steps taken as soon as the first cases of any dangerous disease are reported. It is either gratifying or alarming, according to the point of view, to learn that the percentage increases of population, year by year, for the period 1944–1949 have been 0·18, 0·85, 1·21, 1·55, 1·50, 1·89.

Sleeping sickness continues to be held in check, pentamidine being used mainly for prophylaxis, and suramin and tryparsamide for the treatment of established infections. Prophylactic " pentamidinization " of inhabitants of the Congo river-bank, mentioned in the report for 1948, has been proceeding in the charge of a team operating from a river steamer.

Anti-anopheline work has not been particularly successful, and an effective campaign against larvae is stated to be practically impossible of fulfilment because the villages, over immense areas, are too numerous, too scattered, and too inaccessible. Employment of DDT, details of which are given, led to only a minimal, or at best a feeble, effect on the incidence of infection or on the spleen rates. Among other activities against tuberculosis, BCG vaccine has been administered to a number of infants, and the author believes this to be the first occasion on which the method has been used in rural central Africa. A radiographic " mass chest survey " by mobile teams is due to begin in the near future.

The Report is, as usual, liberally supplied with detailed tables and graphs showing the incidence and trends of diseases, and the nature of counter-measures taken, in various parts of the territory in which the Foréami operates. There is

also much discursive commentary in which the keynote seems, on the whole, to be a buoyant optimism and [with good cause] a consciousness of difficult work well done. *E. M. Lourie*

PURVIS, J. T. **Tanganyika. The Sukumaland Development Scheme.** *Corona.* 1951, Feb., v. 3, No. 2, 67–71.

The question " Must Africa Starve ? " has been asked, the reference being to the wastage of land. The author describes constructive work to avoid this wastage in Sukumaland, a part of the Lake Province of Tanganyika immediately south of Lake Victoria. It is described as " Cultivation Steppe ", partially unoccupied, the remainder overcrowded by a million people at densities varying up to 500 per square mile. The two million cattle, and the sheep and goats, do more harm to the ground than the people.

The first step in development was political ; the federation of chiefs and subchiefs into a single governing body with its own funds, a process taking several years and still with its problems. The second is the re-distribution of people, and it is associated with changes in agricultural and stock-holding practice. Vacant lands are made usable by the provision of small water supplies, simple impounded reservoirs ten miles distant from each other. After the allocation of forest reserves, land is allotted to farmers at a pre-arranged population density, though at times events overwhelm planners. Mechanical cultivation systems are under trial, collective farming is foreseen, and the prospects are good if the African can be persuaded to take a rational view of his cattle ; these are a mark of his prestige, of little commercial value but with great destructive potentiality. The scheme is a pioneer one with normal pioneer difficulties ; success is still to come, but it is hoped that it will provide an example of properly co-ordinated development to many other territories.
G. Macdonald

CEYLON. **Administration Report of the Director of Medical and Sanitary Services for 1949** [WICKREMESINGHE, W. G.]. pp. iv+B 174. Colombo : Govt. Publications Bureau. [Rs. 3·55.]

Ceylon has a National Health Service, the scale of which may be judged from the following data :—

Population of Ceylon	7,297,000
Hospital beds	19,809
,, ,, per 1,000 population ...	2·7
Medical Officers (curative side) ...	553
Ratio of population to M.O.'s ...	13,690 : 1
In-patient admissions per 1,000 population	102
Out-patient attendances per 1,000 population	1,291
Cost per head of population per year...	Rs. 8·5 (12s. 9d.)

The scale of curative medical work is impressive, and almost certainly puts Ceylon foremost amongst Asian countries in the field of medical effort. The country is, however, clearly not aiming at comparison with Asian countries but with those countries of the world already possessing more advanced medical services. It still has some considerable way to go with this object, but is establishing its right by quality and reasoned advance as well as by quantity of work. The report includes accounts of modern hospitals, well equipped and staffed and with many specialized departments, as well as of rural cottage hospitals and dispensaries which are still on a simple standard. A notable feature of policy is the concentration of effort on health centres and on maternity

homes. Over 90 per cent. of expectant mothers came under care in the former and 10 per cent. were delivered in the latter with a maternal death rate of 1·7 per 1,000 births, which may be contrasted with 6·5 per 1,000 for the island as a whole. Deliveries in all types of hospital or home amounted to 36 per cent. of all births.

The efficacy of both the preventive and curative services are reflected in the steady improvement in the vital statistics, following the dramatic reduction of the death rate in 1947. The death rate is now 12·6, the infant mortality rate 87, and the birth rate 39·9. The main causes of death are listed but allowance must be made for the fact that many are not medically certified and diagnoses such as "convulsions" are common. The infective and parasitic causes are still very common. Typhoid and paratyphoid fever, dysentery, diarrhoea and enteritis account for 6,649 deaths, a figure which indicates the next desirable line of advance now that malaria has been brought so nearly under complete control. The report gives proper mention of this defect, which it states is not the sole responsibility of the Medical Department. It is, however, an extremely important aspect of community health to which the Medical Department could well draw emphatic attention.

There are many important parts of this report which can have no more than brief mention. The brilliant malaria control work continues. The work on tuberculosis, venereal disease, leprosy, and filariasis is sound and progressive. Ceylon has been admitted a full member of the World Health Organisation and shows her entitlement by the year's work. *G. Macdonald*

COONOOR. **The Pasteur Institute of Southern India, Coonoor. Annual Report of the Director, together with the Forty-Third Annual Report of the Central Committee of the Pasteur Institute Association 1949–50.** 66 pp., 1 chart. 1951. Madras : Diocesan Press.

This Report follows closely on the lines of its predecessors [for 1948–49 Report, see this *Bulletin*, 1950, v. 47, 572].

It is noted that 358 persons receiving complete or incomplete courses of antirabic treatment at the Institute during the year were followed up. There was one death, giving a mortality rate of 0·28 per cent. At subsidiary centres, such treatment was given to 11,911 patients, and there were 31 deaths, a rate of 0·26 per cent. The usual very detailed tables of statistics are provided.

Much detail is given of Dr. VEERARAGHAVAN's research work on rabies virus, and on *V. cholerae* with which readers of this *Bulletin* will be familiar. There is also an account of his work on the action of BAL and cysteine on cobra venom. It is concluded that BAL has some action on the venom *in vitro*, but no protective action *in vivo* : it is possible that the arachis oil used as a solvent modifies the lethal effect of the venom. Cysteine was without any action. Dr. MENON reports his investigation on the outbreaks of influenza in Nilagiri district and in Madras and on gastro-intestinal fuso-spirochaetosis.

The Nutrition Research Laboratories continued their researches on vitamins and on protein metabolism and record in a table details of findings in 209 cases of deficiency diseases.

In the general laboratory 4,759 routine examinations were made.

The Report includes the usual annual report of the Central Committee of the Institute together with detailed statistical tables. *H. J. O'D. Burke-Gaffney*

CLARKE, M. C. **Some Impressions of the Muruts of North Borneo.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1951, Feb., v. 44, No. 4, 453–64.

A most interesting account of a primitive people, or at least of people living in primitive conditions, and particularly interesting to medical anthropologists.

The author starts by telling of the Muruts of North Borneo and their origin. Though neighbouring villages do hold communication, each village is really an autonomous unit. The area is sparsely populated and a village rarely comprises more than 100 persons. " There are perhaps 20,000 natives scattered over seven or eight [? 7,000 or 8,000] of the total 31,000 square miles comprising North Borneo ". All the women are illiterate [this is not defined] and 90 per cent. of the men. The adult males are stunted, rarely exceeding 5 ft. 4 in. in height and 110 lb. in weight. Depopulation goes on apace, due primarily to malaria, respiratory diseases, gonorrhoea and ankylostomiasis, to malnutrition and the associated factors of isolation and inbreeding, bad hygiene and high infant mortality. The malnutrition is due to an unbalanced diet and to disease ; maternal mortality is high, 36 per cent. of matings are sterile, infant mortality rate is 227 per 1,000 live births and 11 per cent. of all pregnancies end in miscarriage or stillbirth.

Malaria endemicity is high ; all three parasites are common and *P. malariae* predominates in certain localities, especially Tenom. Malaria is responsible for heavy mortality among the young. The chief, perhaps the only, vector is *A. leucosphyrus*. Pulmonary disease, including phthisis which is widespread, accounts for most adult deaths. Influenza, measles and dysentery have been epidemic from time to time; yaws and helminthic infestations, especially *Ascaris*, ankylostomiasis, *Trichuris* and *Strongyloides*, are excessively common.

The absence of certain diseases is noteworthy, such as smallpox, enteric fevers, tetanus, syphilis (in fact, all venereal diseases except gonorrhoea), leprosy, beriberi, scurvy, pellagra, sprue, angular stomatitis, optic neuritis and burning feet (though common among the local Chinese) but rickets, xerophthalmia, nyctalopia and keratomalacia are not infrequent. Goitre is rife in some districts, with cretinism, and ulcers of the legs are prevalent. A curious enlargement of the parotids, bilateral and painless, is common about the time of puberty and is thought to be associated with malnutrition.

A general summing up is well expressed in the words of the author :

" We can, therefore, say that the Muruts are dying out primarily as a result of disease and malnutrition, and each of these factors tends to aggravate the other. Iodine deficiency is producing goitre, a complaint which intensifies the inbreeding which itself may be working to the detriment of the interior tribes. Malaria is killing by producing abortions and stillbirths, by a direct mortality, chiefly amongst the young, and indirectly by contributing to malnutrition as a result of its morbidity. Infectious diseases, such as influenza, pneumonia, measles, dysentery, etc., have had a very considerable effect in producing depopulation. Tuberculosis is widespread and is taking a heavy toll. Intestinal parasites, chiefly hookworms and ascaris, are further undermining the vitality of the race. Venereal disease and endemic cretinism are probably the chief factors in producing an alarming degree of sterility ". *H. Harold Scott*

DA SILVA, A. C. Problemas sanitários e econômicos da Amazônia. [**Health and Economic Problems in Amazonia.**] *Folha Med.* 1951, Jan. 5, v. 32, No. 1, 4–8.

In 1948 the author visited Amapá and Amazónia and in this paper refers rather discursively to various subdistricts of this area, speaking for the most part in generalities. From the medical point of view, in Macapá, as the result of examination of 250 persons in 40 days, 150 thick drop examinations of blood revealed less than 50 per cent. [figures are given in percentages only throughout] of *P. vivax* and *P. falciparum*, and faecal examinations gave *Entamoeba histolytica* 40 per cent., *Chilomastix mesnili* and *Trichomonas hominis* each 10 per cent., *Giardia intestinalis* 5 per cent. The commonest helminthic

parasites were *Ascaris lumbricoides* 60 per cent., *Necator americanus* 50, *Trichuris trichiura* 30, *Enterobius vermicularis* 10, *Strongyloides stercoralis* 10 per cent. ; no schistosomes or *Taenia*. The most frequent combinations were *Ascaris* and *Necator*, with or without *Trichuris*. [Such general round figures are not very informative, especially with so few total examinations.]

In the Rio Branco district, syphilis, yaws, pinta and cutaneous leishmaniasis were present, but pinta is said to be always imported from Solimões region.

H. Harold Scott

SAWYER, W. A. **Medicine as a Social Instrument : Tropical Medicine.** *New England J. of Med.* 1951, Feb. 8, v. 244, No. 6, 217–24, 3 figs.

A general review.

GALL, D. & MAEGRAITH, B. G. **The Splenic Circulation : Latex-Cast Studies in the Rat.** *Ann. Trop. Med. & Parasit.* 1950, Dec., v. 44, No. 4, 331–8, 2 text figs. & 8 figs. on 2 pls. [13 refs.]

BOOK REVIEWS

MARTIN, Betty [Edited by Evelyn WELLS]. **Miracle at Carville.** pp. v+302. 1950. New York : Doubleday & Company Inc., Garden City. [$3.00.]

Leprosy is a physical disease caused by a microorganism. But it is much more than that. In whatever country it is found there is something about it which makes it a social disease, because it is regarded by the public with fear and horror and therefore breeds shame and the desire for concealment in the sufferer himself, and indirectly in his family. Books have been written depicting this condition, perhaps the best of which is *Who Walk Alone* by Perry BURGESS [see this *Bulletin*, 1941, v. 38, 674]. But the unique quality of the present work is that it is a true autobiography, written by one who spent more than a decade passing through this gruelling experience.

Much has been written on the sulphone treatment in recent years, but here we have for the first time a personal picture of the long-drawn-out mental agony of leprosy, and then at last the wonderful relief when an effective drug clears up first the clinical signs and then renders bacteriological examinations negative. It was at the National Leprosarium, Carville, Louisiana, that sulphones in the form of Promin were first tried out in leprosy, and the author and her husband were among the first to benefit from the treatment. The first result was a discouraging exacerbation, but when this had subsided the patients were much better, chronic ulcers of the legs healing up and the patients being rendered stronger and fit for work. Gradually it came to be realized that the sulphones were permanently effective, unlike the many so-called " cures " of the past. This was the " Miracle of Carville ", and certainly it did appear as a miracle to these poor sufferers for whom so often in the past hopes had been raised only to be dashed to the ground a few months later.

The book is written in a simple, interesting style giving details of every-day life, the hopes and fears as felt and seen first in the home and then in the leprosarium. There is a love story, a flight of the couple by night from the institution when the disease appeared to them to be arrested, and then relapse and return to Carville where more years are spent in despair, with gradual weakening and encroachment of disease. This is the background against which appears at last the dramatic discovery of the effectiveness of sulphones in leprosy. Up to page 222 almost breathless interest is maintained, but the next 50 pages are occupied chiefly with propaganda, useful in itself especially

for the American public, but for the reader outside America clashing with the free narrative of the rest of the book. The narrative is resumed again in the last 25 pages.

This book should be read and pondered on, especially by all engaged in the treatment and care of those afflicted with this, till recently, saddest of all diseases. *Ernest Muir*

HÖRING F. O. [Prof. Dr.]. **Exotische Krankheiten und Krankheitsverläufe.** [Exotic Diseases and their Course.] pp. xi+407, 51 figs. 1950. Stuttgart: Georg Thieme Verlag. [DM.36; $8.55.]

This book is meant primarily for the German medical public, especially those who, as a result of recent large population movements, may meet exotic diseases in their ordinary practice. It is designed to present an account of tropical disease which will serve the purpose of filling the gap in medical literature resulting from the absence of a recent text-book in German. Its emphasis is clinical and description of the pathological and hygienic aspects of the subject are limited as far as possible to the immediate needs of the clinician. Descriptions of diseases are clear and the sections on treatment are adequate if a little out of date in places, as in the discussion on the chemotherapy of malaria.

The arrangement of the book is awkward in some ways. Diseases are classified according to the effects on the human body rather than according to aetiological factors. To some extent treatment is dealt with similarly. The first section of the book is called "Infections" and is divided into: A, Acute Infections, subdivided into Acute Local Infections—pyogenic, skin (including plague), jaws and mouth, conjunctiva, sex organs and intestinal tract—Acute Cyclic General Infections—clinically indeterminate acute cyclic general infections, pneumotropic, dermatotropic, neuratropic, visceratropic, adenotropic (including tularaemia), enterotropic and rhythmic fevers or acute reticuloses: B, Cyclic Chronic General Infections, beginning acute (malaria, trypanosomiasis, visceral leishmaniasis, etc.) and C, Chronic Infections, divided into cyclic general infections (tuberculosis, leprosy, syphilis, yaws and pinta) and local infections (sex organs, upper respiratory tract, skin). The second main section deals with "Invasions," and is concerned most with worm infestations, but also includes dermal intestinal myiasis, scabies and chigger infestation. The third section covers "Deficiency diseases," included among which is sprue. The final section includes accounts of "other exotic internal diseases, as well as observations on the geographical pathology and differential diagnosis of cosmopolitan conditions." Here there is a triumphant gallimaufry of anaemia, splenomegaly, enlargements of the liver, cirrhosis, dental disease, hypotonia, diseases of the kidney, diseases of the endocrine glands, nervous diseases, tumours, bites and stings.

The disadvantages of the author's classification (for instance, the separation of plague and tularaemia) will be obvious to those accustomed to the more usual arrangements, but there is something to be said for his point of view, namely, that disease (and even chemotherapy) may be better considered in relation to man than in relation to the infective or active agents. In any case it appears to the reviewer that the book has lost a great deal as a result of attempting too much. *B. G. Maegraith*

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